

Coal Age

JUNE, 1946

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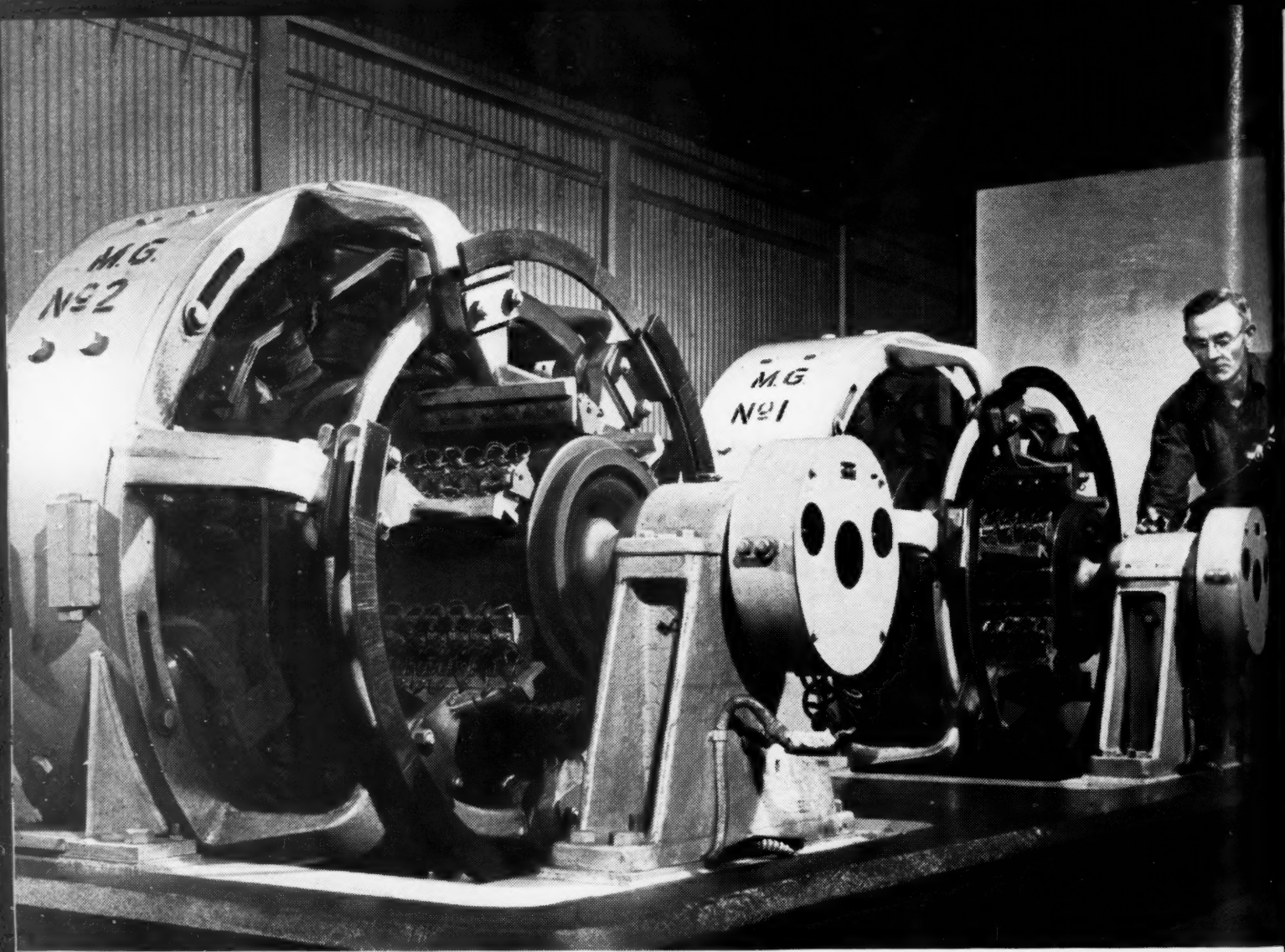
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★ COAL CRISIS—1946 . . . P. 6



BEARINGS RUN *10° Cooler*

SOLNUS OILS . . .

End High Bearing-Temperatures in Power Plant

You can't mine without power, and you can't make profits when equipment is down for excessive repairs. A Sun Engineer was called to a power plant where generator bearings were running hot. Oil was being thrown onto the generator-coils, and possible shutdown was foreseen.

Bearing temperatures dropped, and the oil-throw problem was permanently licked, when the plant switched to a Solnus Oil, recommended by the Sun Engineer.

This case is just one of hundreds in the Sun files . . . cases in which Sun Engineers and Sun petroleum products have teamed up to solve problems, increase production, avoid shutdowns.

For all mine equipment . . . for lifts, hoists, drills, loaders, cars, locomotives, conveyors, fans . . . from the face of the mine to the top of the tippie . . . there are Sun lubricants specially refined to keep up production, hold down costs. Call the Sun man near you today for full information.

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

SUN
— **SUNOCO** —

**INDUSTRIAL
PRODUCTS**

A development of
B.F. Goodrich
FIRST IN RUBBER



River of iron flows uphill on a rolling bed of rubber

A typical example of B. F. Goodrich improvement in rubber

POURING up that steep grade is a never-ending stream of iron ore — a thousand tons an hour.

Ore used to be shoveled into cars that inched their way out of deep mines; too expensive. Next they tried conveyor belts, but no belt could be made strong enough for long quarter-mile hauls like this one, and a series of belts was expensive, always causing breakdowns and delays.

Then B. F. Goodrich developed a new kind of belt made of individual cords surrounded by rubber. Because

it is lighter, it can be made in almost any thickness and strength without getting stiff and unwieldy. One B. F. Goodrich belt of this new type was made, long enough to replace three belts formerly used. Because its design makes it light and flexible, this B. F. Goodrich belt takes exactly the right shape for carrying maximum load — and has been pouring 1100 tons of iron ore up and out of the mine every hour ever since.

Owners say this B. F. Goodrich belt is saving them \$30,000 a year by elimination of transfer points, plus all

the time and cost formerly wasted in shutdowns and repairs, and is increasing the output of the mine. Rubber products like this, *better suited to the job*, are resulting constantly from B. F. Goodrich research. As you get ready for greater peacetime business ahead, it will pay you to find out what BFG has developed that can help you increase production and reduce costs. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B. F. Goodrich
RUBBER and SYNTHETIC products

First in its Field....



William Procter, Jr., 1817-1872, reading to his apprentice the details of one of his experiments. Reproduction of Dean Cornwell's painting, courtesy of Wyeth, Incorporated, Philadelphia.

FATHER OF AMERICAN PHARMACY

Although his "laboratory" was only the back of his Philadelphia drugstore, William Procter's influence spread across the world and down the years. As a writer and scientist, Procter contributed more than 500 technical articles to the advancement of pharmacy. As a teacher he inspired his students with the dignity and scope of pharmacy as a profession. As a founder of the American Pharmaceutical Association he first established the high standards of personal integrity and scientific accuracy which the world depends on today.

In the field of lubricating grease for use in the coal mine, it was HULBURT who first established the high standard of **QUALITY** of the famous Grease on which so many coal mine operators depend today. For over a quarter century, the result of using **HULBURT QUALITY GREASE**, backed by HULBURT down-in-the mine Lubrication Engineering Service, has contributed immeasurably to the more economical and efficient operation of coal mining equipment. The "prescription" for lubrication troubles is **HULBURT QUALITY GREASE**.

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

...a record of

American Leadership



HULBURT

THE
"FIRST NAME"
IN

Quality
GREASE



What every Hazacord offers...

when you select
PORTABLE CORDS AND CABLES

From the smallest size to the largest — *all* Hazacord Portable Cords and Cables are *pressure* cured in *continuous* metal molds — a Hazard process that provides maximum jacket density . . . extra surface smoothness . . . more all around resistance to mechanical damage in normal mining use or even under abuse. In short, no matter what size portable cord or cable you need, select a Hazacord and count on getting longer, more dependable service — the kind that reduces operating costs.* Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.



AMPLE FLEXIBILITY is inherent with Hazacords because numerous copper wires are skillfully stranded to form the conductors.

***ADDITIONAL PROTECTION THAT PAYS OFF** is also yours with every Hazacord size 8AWG and larger because a Hazaprene jacket is provided. Hazaprene successfully resists such destructive agents to ordinary rubber as oil, grease, water, chemicals, acids, etc. . . . is flame-resisting (Penna. Bureau of Mines Approval No. 104). When specified, a Hazaprene jacket can be had on Hazacords smaller than 8AWG.

HAZARD 

insulated wires and cables for every mining use

Coal Age

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330 West 42d St., New York 18, N. Y.

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Old Address

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FOR PROFITABLE COAL STRIPPING **MARION** HAS THE MACHINE *You* WANT!!

Whether it is in Bituminous or Anthracite fields under many varied conditions of stripping, MARION has a proven machine of a size and type to meet every stripping problem.

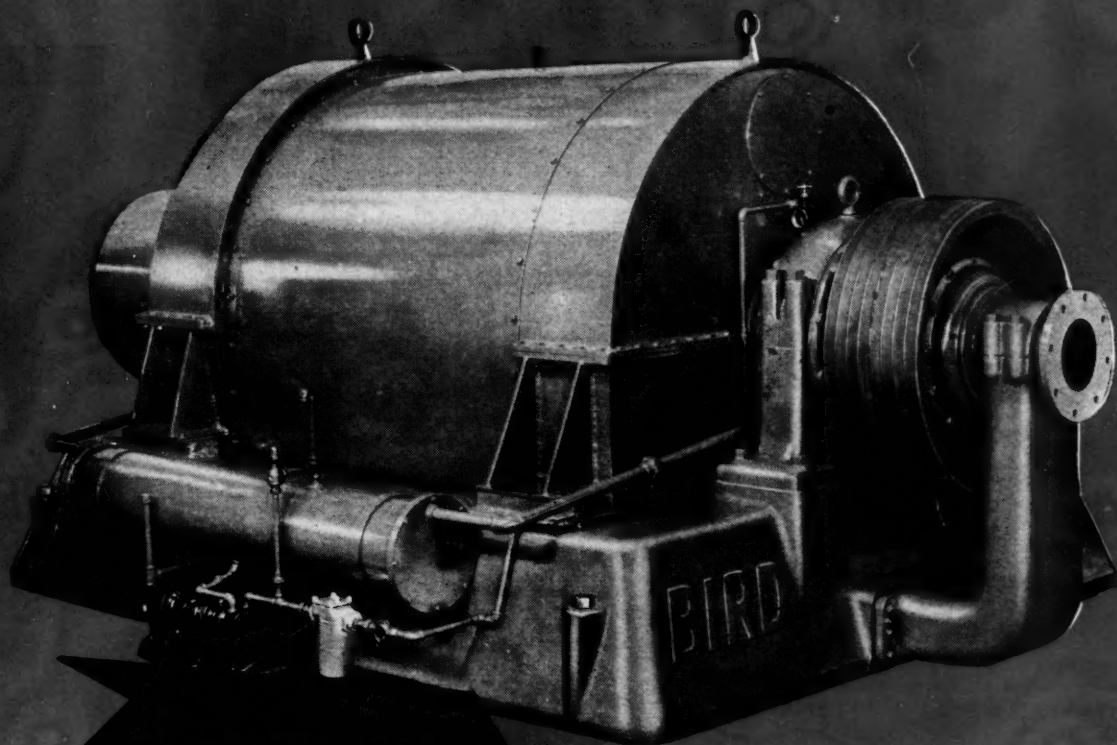


WHAT IS YOUR STRIPPING PROBLEM?

MARION

POWER SHOVEL COMPANY
MARION, OHIO, U.S.A.

Offices and Warehouses in Principal Cities. • NOTE: Marion Power Shovel Company - Formerly The Marion Steam Shovel Company - Established 1884.



You produce coal
at lower cost when
you dry your washed fines

with this
BIRD

You can put all the fines from your coal cleaning system directly through this Bird Centrifugal Filter. They'll come out dry and whole, ready for immediate blending with the larger sizes. Dilute feed can be handled without thickening. The filtered water is so clean it may be used over and over.

**IT RUNS FOR MONTHS
WITHOUT A SHUT-DOWN
FOR MAINTENANCE**

The BIRD is built to handle 40 tons or more per hour, *continuously*, without parts replacements or overhaul of any kind.

These are tall claims but once you find out how it works and what it's doing you'll readily appreciate that the BIRD can back 'em up. For the details write Bird Machine Company, South Walpole, Massachusetts.

The BIRD

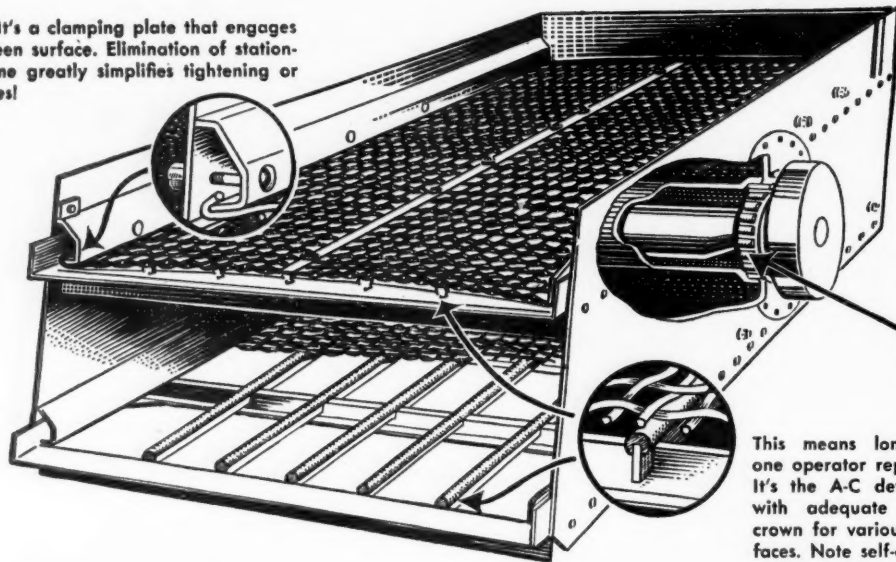
**Continuous
Centrifugal**

FILTER

"Low Cost -- High Capacity!"

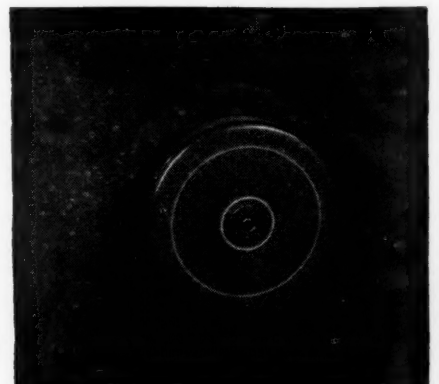
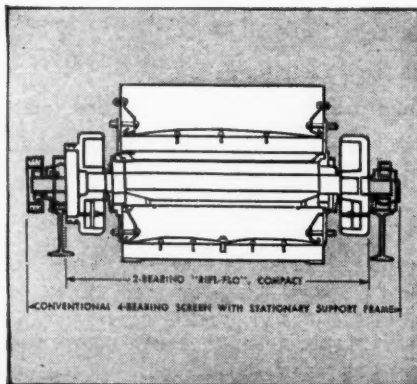
THAT'S THE STORY IN A NUTSHELL ABOUT AMERICA'S
NO. 1 VIBRATING SCREEN--THE "RIPL-FLO"!

This saves time! It's a clamping plate that engages and tensions screen surface. Elimination of stationary support frame greatly simplifies tightening or changing surfaces!



This means low initial cost, low power consumption, low maintenance! Only 2 bearings are required to impart perfect circle motion to screen surface and body!

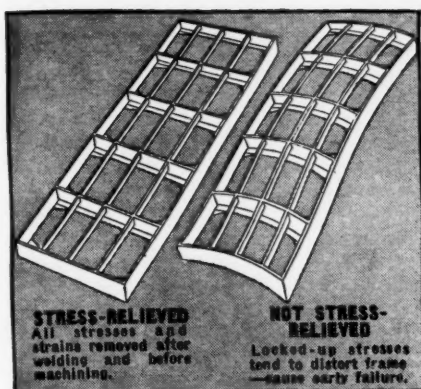
This means longer wire cloth life—one operator reports up to double life! It's the A-C developed support frame with adequate strength and proper crown for various grades of screen surfaces. Note self-clamping, wear-resisting rubber buffer strips that "cushion" screen surface from frame.



1 Fact is, 2-bearing "Ripl-Flo" costs less than any comparable 4-bearing screen—yet does as good or better screening job! One reason we can build it for less, pass savings to you is that . . .

2 Extra outer bearings, stationary support frame, all superfluous parts are eliminated—reducing width 17%, weight 36%! This, coupled with perfect balance, cuts amount of power required.

3 Yes, Ripl-Flo's perfectly balanced mechanism means smooth performance, uniform travel of material over entire surface, rapid stratification of bed, full capacity! Want low maintenance?



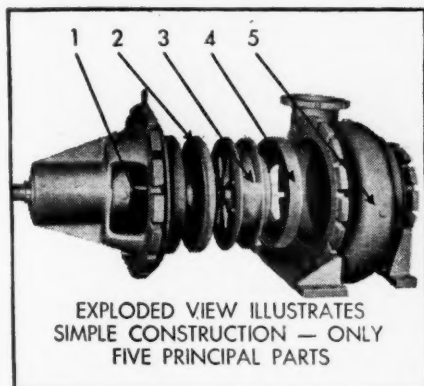
4 Screen body is high tensile strength alloy steel (up to 50% stronger than regular steel). All welded parts are "stress-relieved" to eliminate structural failures—give extra years of screen life!



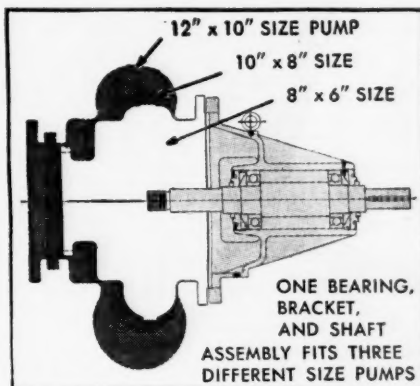
5 Before it can go out to do a job for you, every "Ripl-Flo" screen must pass a tough, 2 hour "exam." Running in a special test rig, it's checked for throw, balance, bearing temperature, etc.



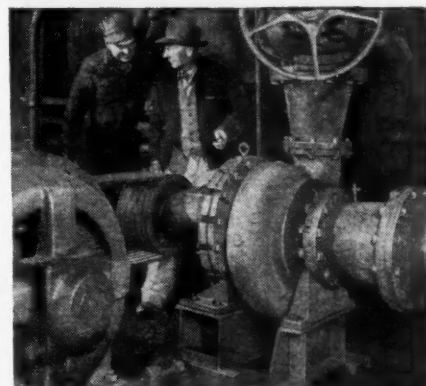
6 The customer gets his choice at A-C—can select from 8 different types of screens! Want more details on modern, up-to-date Ripl-Flo—1 to 4 decks? Send for Bulletin B6151B.



7 Another A-C help is the new "Solids-Handling" pump—that promises 2 to 4 times longer life—cuts parts inventory much as 2/3—materially reduces downtime! It's so designed that . . .



8 You can remove entire rotating element *without* disturbing piping—take apart, re-assemble entire pump fast as 1/2 hour! And, it is comparable in price to ordinary high efficiency pumps.



9 Here's what one operator reports: "Downtime cut 400%; power savings \$7 day; parts inventory cut 70%!" Want a new low cost per ton of solids pumped? Get Bulletin B6381.

GET THIS "TEAM-UP" FROM ONE SOURCE!

Equip your plant with *basic machinery plus* economical power equipment to run it—get it all from 1 company! Yes, A-C not only builds screens, crushers, grinding mills, kilns, etc.—but also power generation, distribution and control equipment—motors, pumps, blowers, compressors, Tex-rope V-Belt drives—over 1600 different products for you!

A-1968

ALLIS-CHALMERS

PRODUCER OF WORLD'S LARGEST LINE OF
CRUSHING, CEMENT & MINING EQUIPMENT!

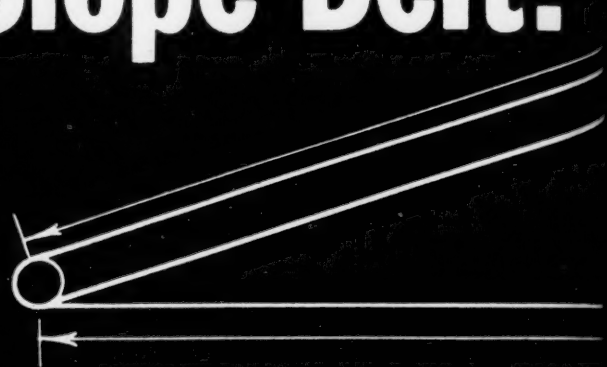


MILWAUKEE,
WISCONSIN

NOW

A 290-FOOT LIFT on a Single Slope Belt!

**Another
COMPASS
Achievement!**



TODAY, deeper mines than ever before can enjoy the benefits and economies of conveyor belt slope haulage—thanks to the G.T.M.—Goodyear Technical Man. For with Goodyear's patented COMPASS construction it is now possible to lift tonnage loads to new and greater heights—without transfers.

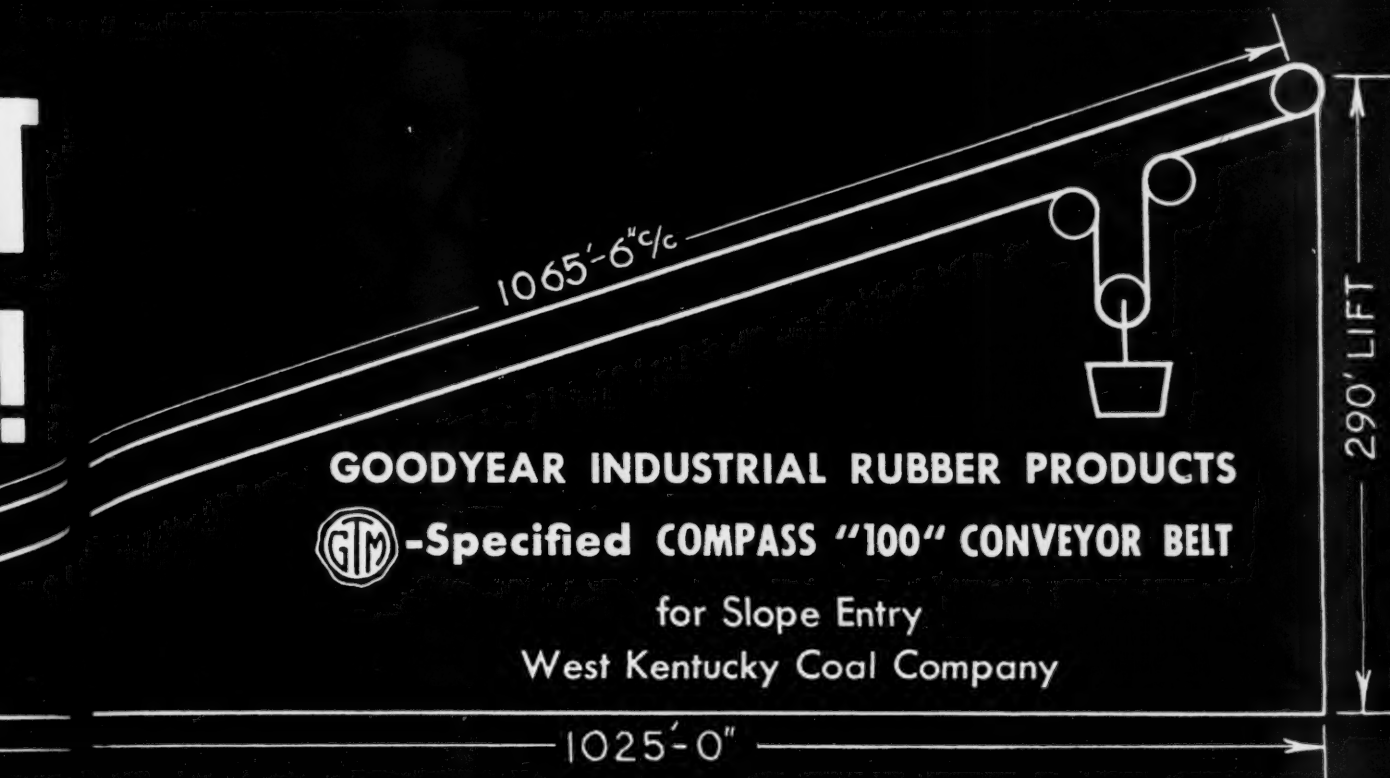
Latest and most dramatic example of this development is the slope entry of the West Kentucky Coal Company's East Diamond Mine. This 290-foot lift is spanned by just *one* conveyor belt — a 42" Goodyear COMPASS "100." Operating 450 feet a minute, it hauls 500 tons an hour. Up to now, this is the *world's*

record lift handled by a *single* conveyor belt.

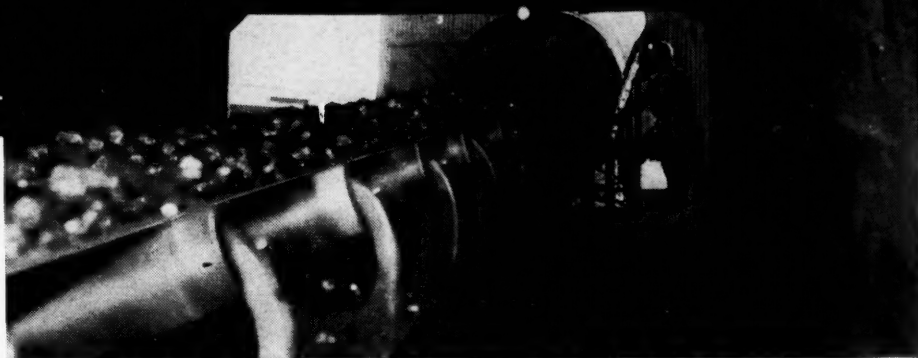
Bigger One to Come

But big as it is, it is not the last word. For Goodyear is conveyorizing *with one belt* another installation almost twice as high—572 feet. And even no-transfer lifts of 1,592 feet are now practicable with a single COMPASS belt.

These enormous lifts are the result of Goodyear's exclusive COMPASS construction in which the load carrying elements—whether cotton cord or steel cable—are all in one plane. This uni-planar feature affords great strength with larger tension capacity, better troughing. COMPASS is mildew- and acid-inhibited, too.



GOODYEAR INDUSTRIAL RUBBER PRODUCTS
G.T.M. -Specified COMPASS "100" CONVEYOR BELT
 for Slope Entry
 West Kentucky Coal Company



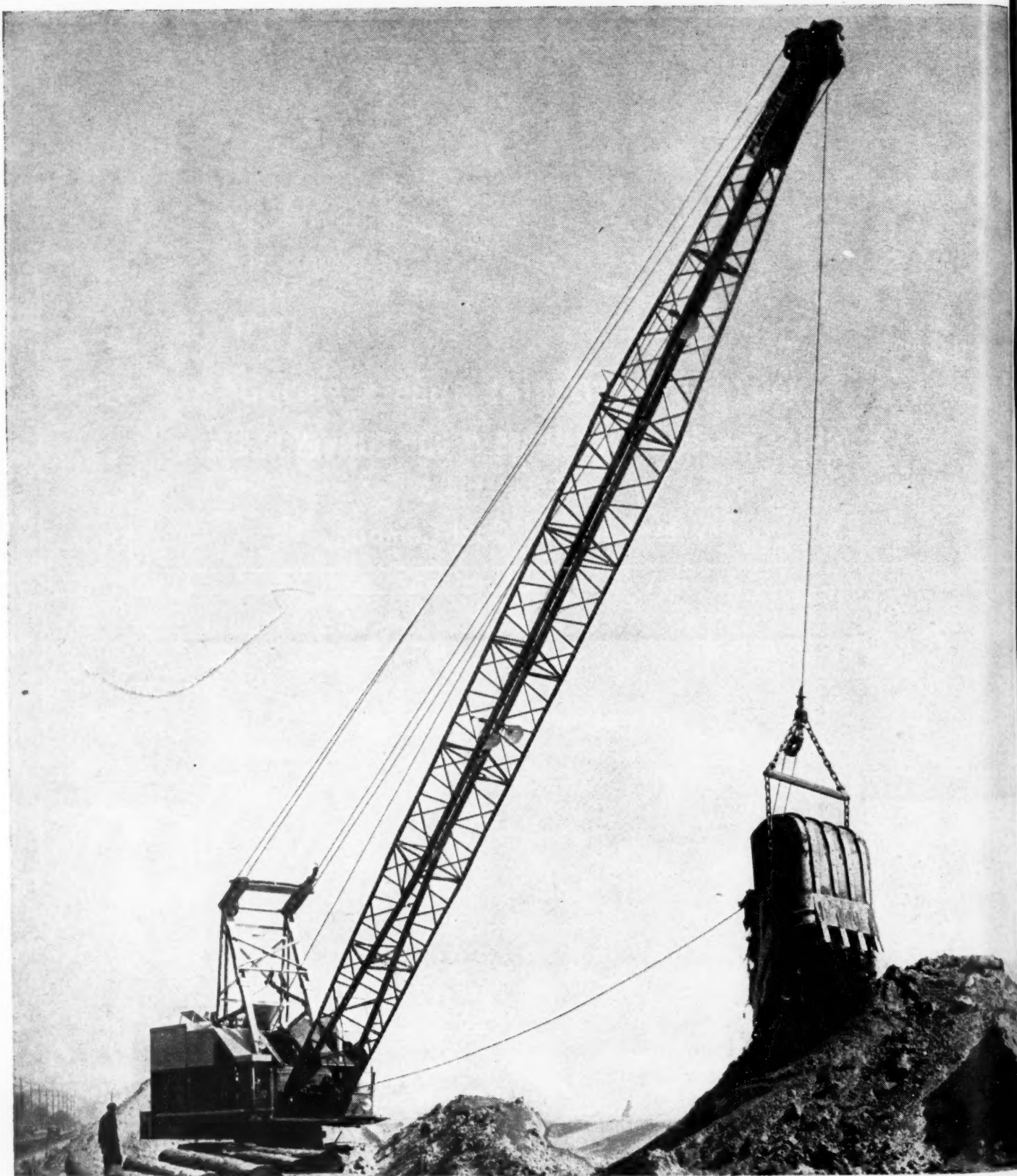
Specify COMPASS on the slopes, along with Goodyear "Coal-Flo" belts underground. That's your top team for lowest-cost-per-ton transportation. The G.T.M. will be glad to give you additional information. Write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

FOR HOSE, BELTING, MOLDED GOODS, PACKING built to the world's highest quality standard, phone your nearest Goodyear Industrial Rubber Products Distributor.

GOODYEAR

THE GREATEST NAME IN RUBBER

Compass, "Coal-Flo"—T.M.'s The Goodyear Tire & Rubber Company



TUNE IN
THE TEXACO STAR
THEATRE EVERY SUNDAY
NIGHT STARRING
JAMES MELTON
WITH HIS GUEST,
ED WYNN — CBS



TEXACO LUBRICANTS

LONGER LIFE

for wire rope

protected

OUTSIDE

INSIDE



YOUR wire rope will stay strong longer — give you many extra months of efficient service — if you protect it with *Texaco Crater A*. That's because *Crater A* provides thoroughly effective lubrication *both inside and out*. It penetrates—greatly reduces friction and wear resulting from rapid flexing.

You can depend on *Texaco Crater A* to retain all its protective qualities under the most adverse operating conditions. It resists the corrosive effects of weather and mine water. It has been the standby of experienced operators the world over for more than 30 years.

Texaco Crater is also an extremely effective lubricant for open gears. It cushions

heavy loads and shocks, quiets noise, materially reduces wear.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C*, 135 East 42nd Street, New York 17, N. Y.

•
FREE! Texaco Maintenance Lubrication Charts are prepared in cooperation with leading manufacturers of underground mining machinery. They approve Texaco products for use on cutters, loaders, locomotives, etc. Charts show clearly *where* and *when* to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

For the Coal Mining Industry

O.M.C. says:

(OLD MAN COMPETITION)



**Top production . . . yes,
but now watch costs!**

Successful business operation in the face of growing competition will force utmost economy from all supplies and equipment.

Wire rope in mining operations must do its part in keeping costs down, too. Specifying Roebling "Blue Center" Steel Wire Rope—made of the finest wire rope steel produced—is a sure step in this direction. Its toughness, its long life, its reserve strength under all conditions of operation

. . . these help reduce costly replacement shutdowns, make its *average* cost low.

Let a Roebling engineer help you select the *right* wire rope for maximum service. Equip now to help meet the coming years of competition profitably.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities



WIRE ROPE AND STRAND • FITTINGS • SLINGS • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • COLD ROLLED STRIP • ROUND AND SHAPED WIRE • WIRE CLOTH AND NETTING • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS
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ROEBLING

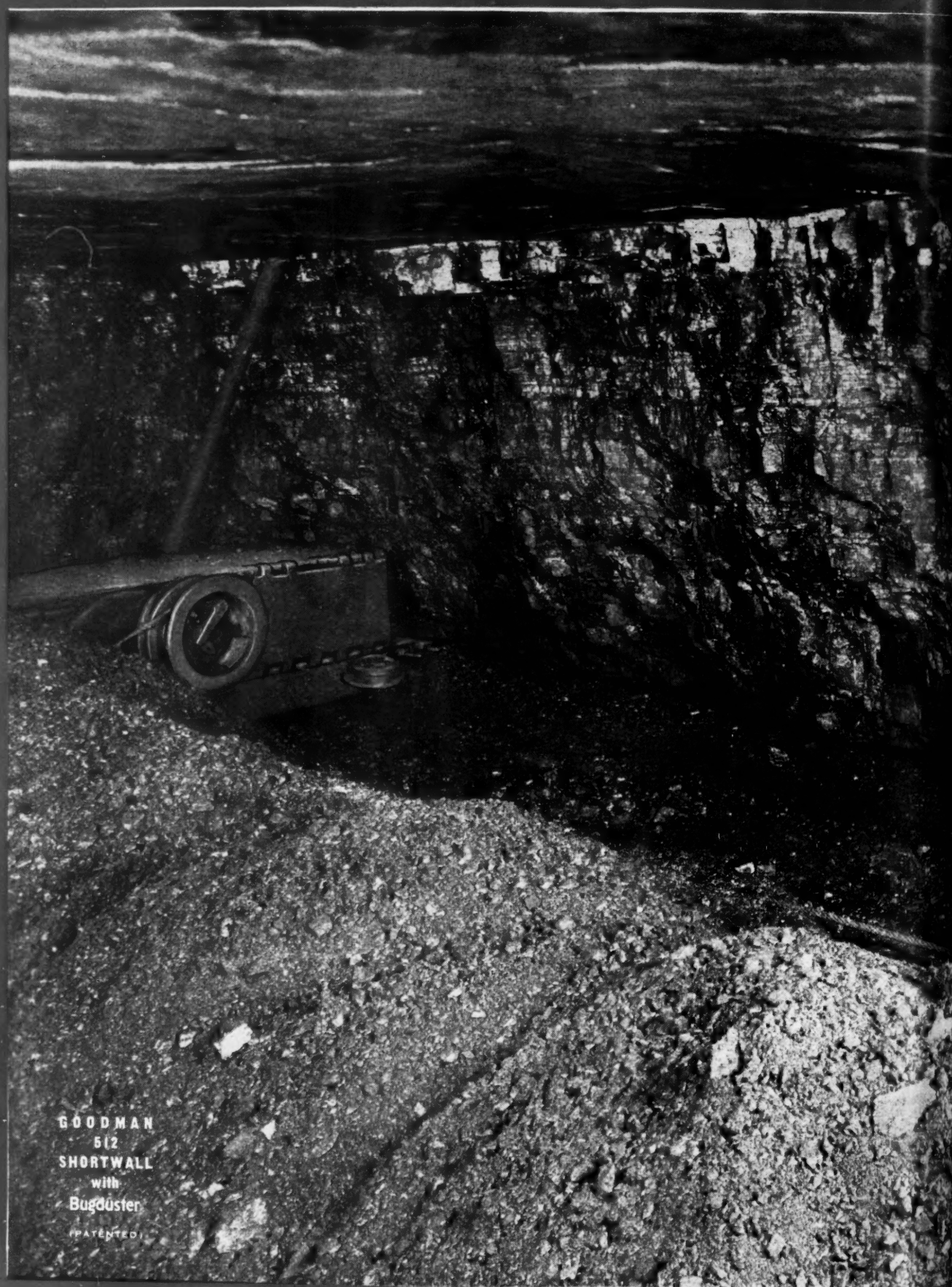
PACEMAKER IN WIRE PRODUCTS



**Roebeling skill in
wire rope making—**

**gives staying power
to rope at work!**





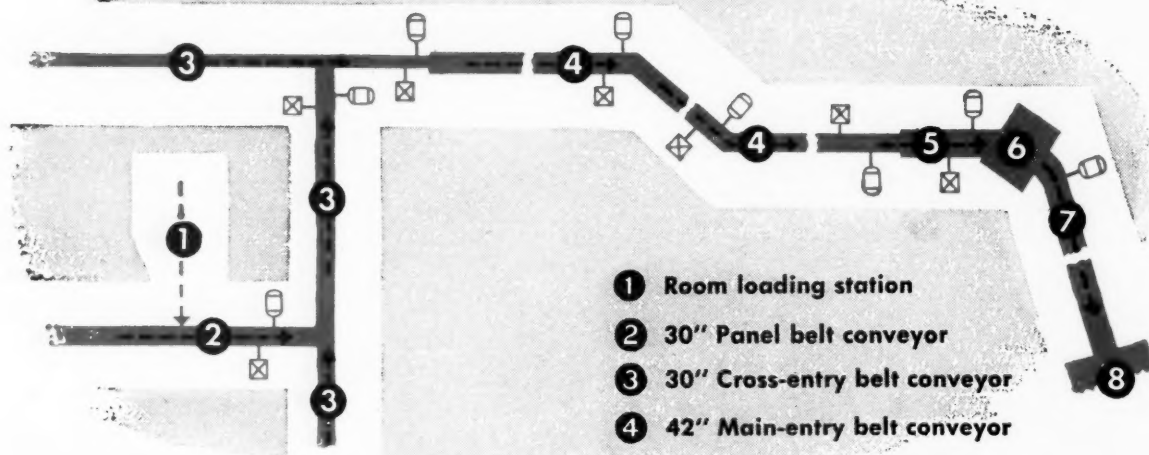
GOODMAN
512
SHORTWALL
with
Bugöster
(PATENTED)



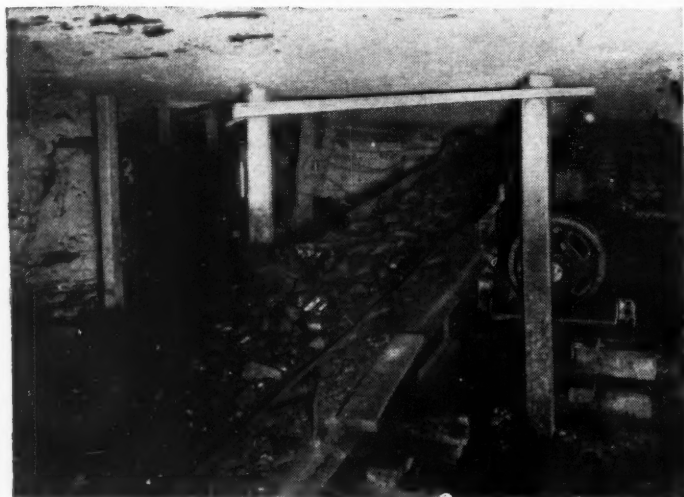
Award Winner



MOVES



- ① Room loading station
- ② 30" Panel belt conveyor
- ③ 30" Cross-entry belt conveyor
- ④ 42" Main-entry belt conveyor
- ⑤ 54" Shuttle belt conveyor
- ⑥ 120-Ton surge bin
- ⑦ 48" Slope belt conveyor
- ⑧ Wet cleaning plant
- Conveyor-drive motor
- Rotary conveyor-drive switch

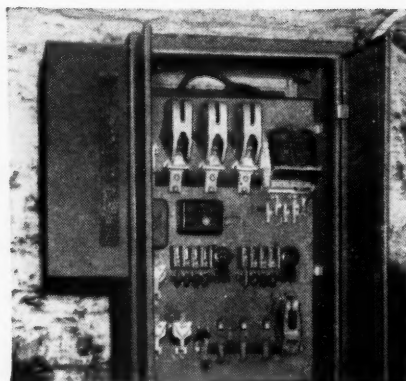


Coal on a 30-in. belt, approaching point of transfer to 42-in. belt line.

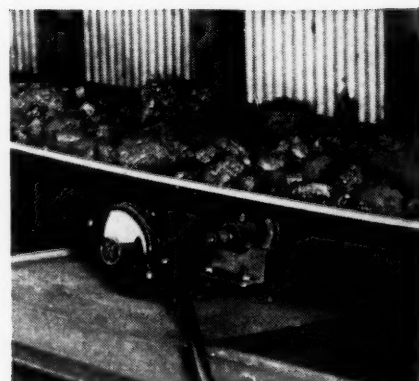
Diagram shows how a G-E-equipped network of 32-in. and 42-in. belt conveyors serve North Diamond No. 2 over a mile stretch from face to slope belt.



G-E wound-rotor motors like the one above drive the main conveyor belts. Typical ratings at 40 hp and higher.



G-E combination starters with full undervoltage and overload protection, control all conveyor motors rated 50-hp and higher.



This G-E rotary switch cannot be actuated until a predetermined belt speed is reached. It assures coordinated conveyor speeds.

5,000 TONS A DAY

... on G-E-protected belt system

Mile-long conveyors at North Diamond No. 2 depend on G-E interlocking drives and controls for high-speed operation without risking coal pile-ups or personnel hazards.

At the North Diamond No. 2 mine in Earlington, Ky. you won't find idle face loaders waiting for conveyor bottlenecks to clear. That's because this efficiency award-winning mine moves coal *fast* — over 5000 tons of it every 24 hours! This calls for high conveyor speeds without confusion, pile-ups, or accidents. All this is made possible by a highly reliable system of G-E conveyor drives and interlocking controls.

From cross-entry belts straight through to slope belt, conveyor operation is tightly co-ordinated. Neither power interruptions, shutdowns for inspection, nor operators' errors can tangle up this system. Here's what G-E interlocking control does:

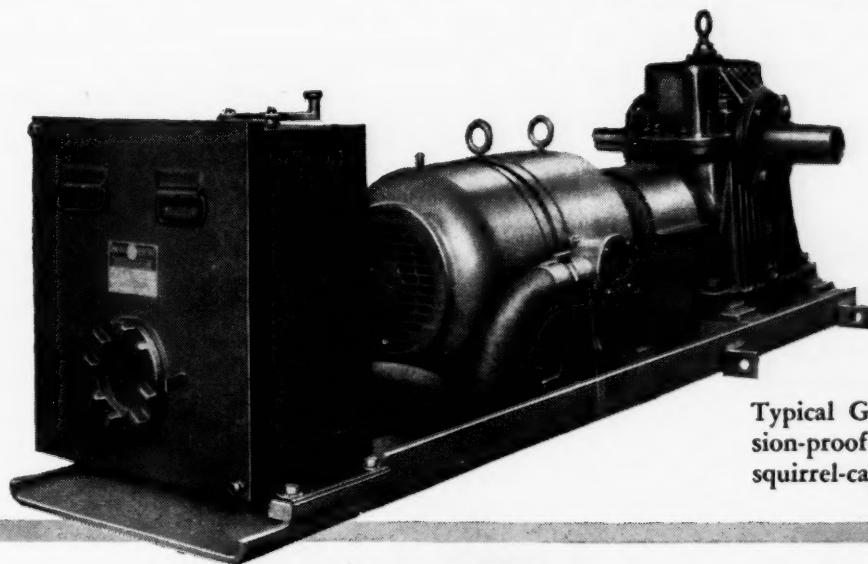
1. It makes every belt start in its proper sequence.
2. It prevents an intermediate belt from starting until the belt preceding it is up to speed.
3. When it stops a belt, it automatically stops all belts feeding it.
4. It reduces spillage possibilities at transfer stations by cutting down belt coasting.

Some of the control developments that made possible these advantages are G-E starters that permit easy motor starting without sacrificing torque, important when belts are fully loaded; G-E relays that respond to control signals over 2500-foot leaps; and a G-E rotary-type switch which precisely times the operation of belt-drive starters.

Greater Safety

Besides the increased output you can expect from G-E interlocking conveyor control, you make more efficient use of power when conveyor motors are prevented from starting all at once. Safety conditions are improved because unexpected restarts are eliminated. Maintenance is less when motors start and operate at the right speeds.

We will be glad to discuss ways and means of applying this new system of conveyor control in your mines. Just call the nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



Typical G-E a-c full-voltage explosion-proof starter, connected to a G-E squirrel-cage induction motor.

GENERAL  ELECTRIC

657 54-148

LIKE A CHAMPION MARKSMAN..



FORM-SET ROPE *IS Relaxed*

The sharpshooting rifleman can't afford tension. Watch him as he sights on the bull's-eye. Keen, alert, a study in concentration, he's nevertheless relaxed. The slightest twitch or jerk as the trigger is squeezed would throw him off line.

Much of that same relaxed effect is present in Form-Set rope—Bethlehem's preformed. Wires and strands have been helically shaped in advance, before being laid in the rope. They retain this helical shape; they have no urge to uncoil. This is because the preforming process coaxes the tension from each individual strand.

Broken Form-Set wires lie perfectly flat; they don't bush out to snag on hands or clothes. You can see for yourself by cutting some Form-Set rope. No flying apart at the ends. You have to *lift* each strand or wire to get it apart from its mates.

But the most valuable feature of preformed rope is its great flexibility. Being relaxed, it naturally bends more easily over your sheaves and drums. This means far less bending fatigue . . . and that, in turn, means longer life . . . greater economy.

Every grade, size, and type of Bethlehem wire rope is available in the Form-Set construction. Get full particulars from the nearest Bethlehem office or distributor.



A cut section of Form-Set rope. The strands have been purposely lifted apart. They can't spring up by themselves, for the tension, the urge to uncoil, has been removed by preforming.

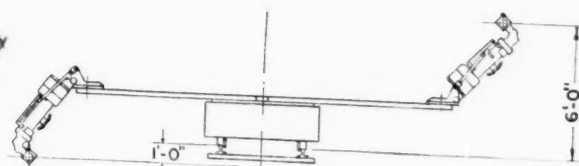
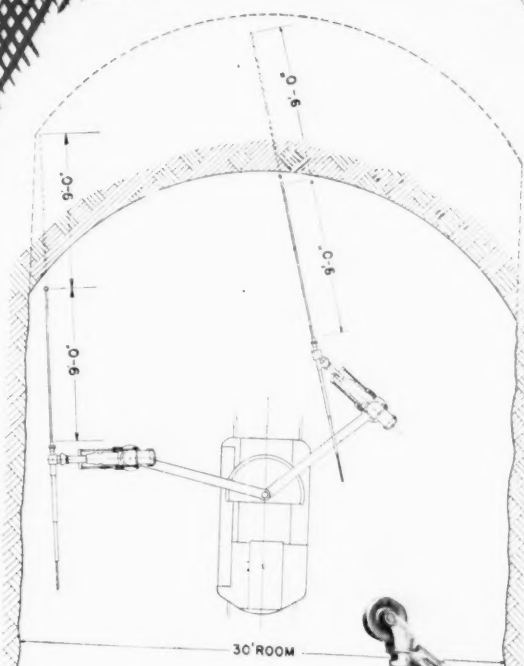
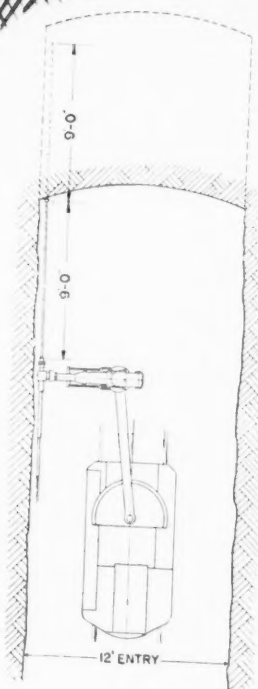
When you think WIRE ROPE



think BETHLEHEM

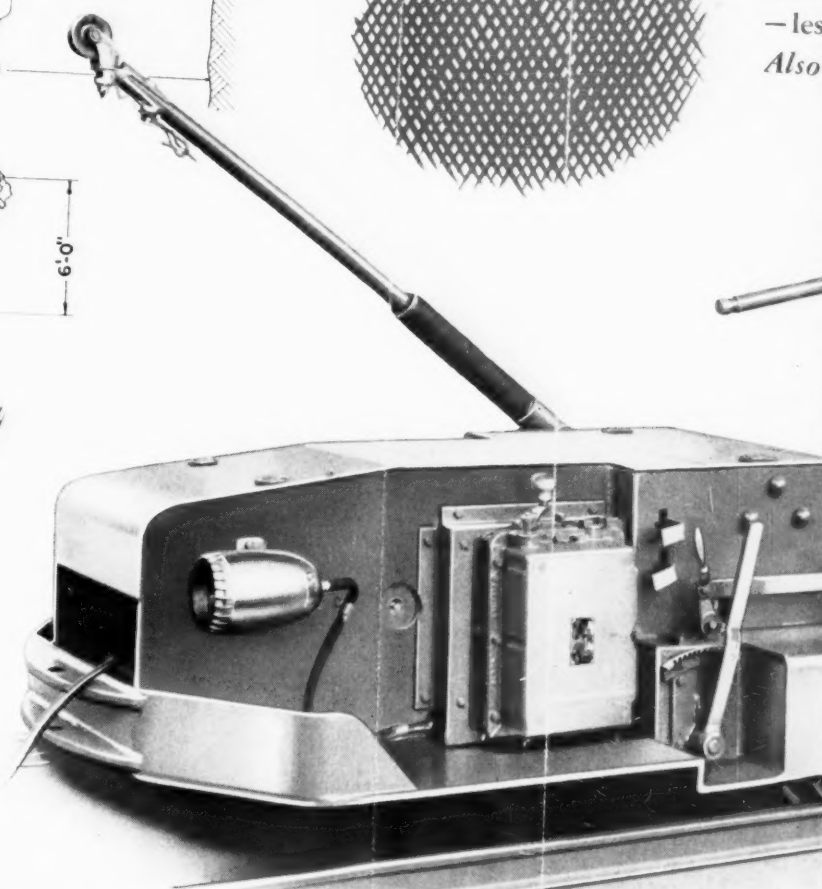
JEF

With
avail
opera
and
opera
Holes
in pla
bottom
result
—less
Also



**JEFFREY
A-6
POST
DRILL**

18335



**JEFFREY
56-A DRILLING
MACHINE**

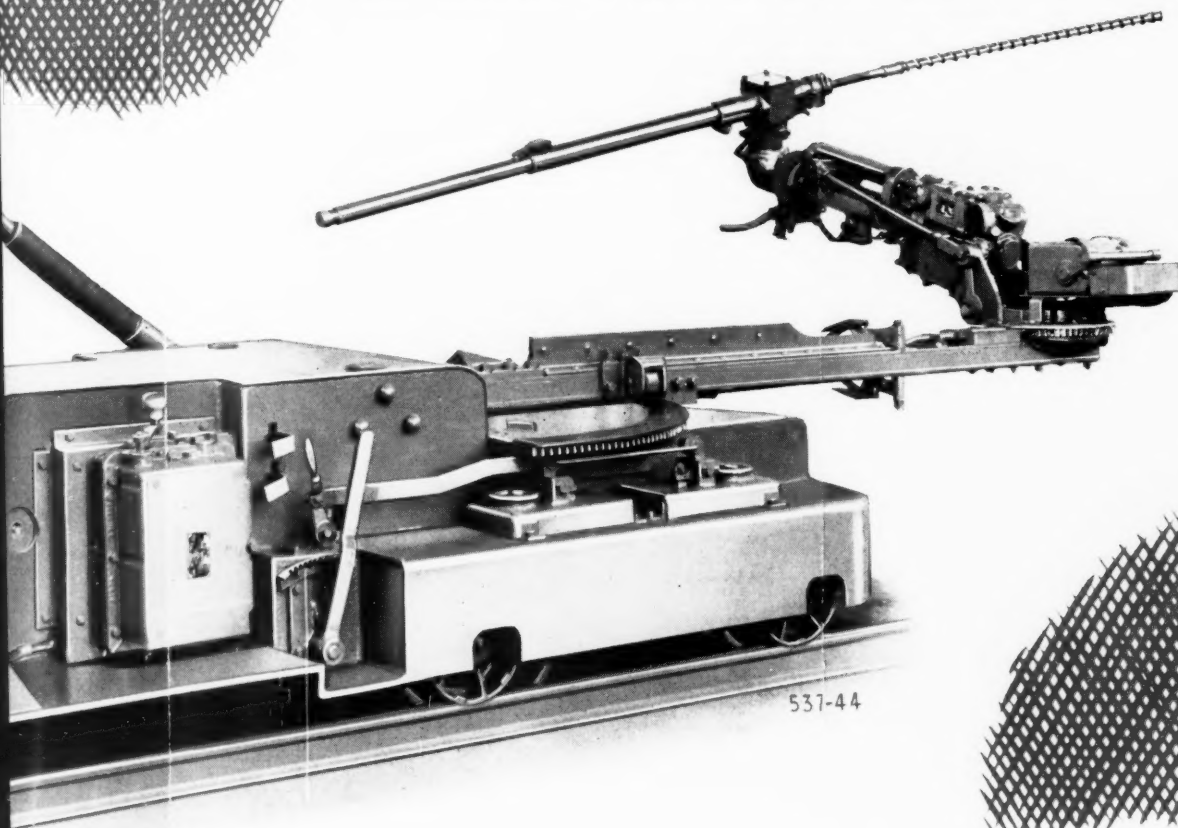
J
HA

JEFFREY DRILLS

(PATENTED)

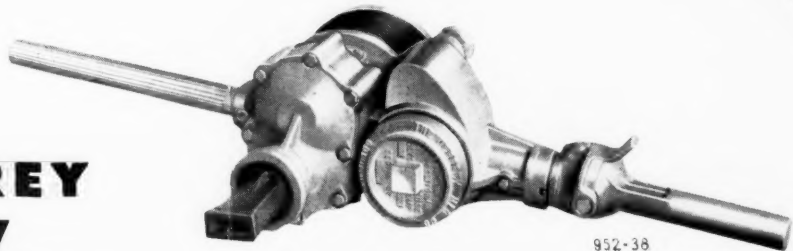
With the cost trend moving steadily upward it is essential that every available mechanical device be used to increase production and reduce operating costs. The Jeffrey 56-A Drilling Machine presents many time and cost saving advantages. Its high degree of mobility and ease of operation ideally adapts it to mechanical mining operations.

Holes can be driven parallel to and very near the top, bottom and ribs, in places as high as 7 feet and as wide as 30 feet. Holes parallel to top, bottom and ribs, in most cases, permits more efficient use of explosives, resulting in less injury to the roof and ribs—less powder consumption—less breakage of coal—and better preparation for loading machines. *Also shown are the Jeffrey A-6 and A-7 Drills.*

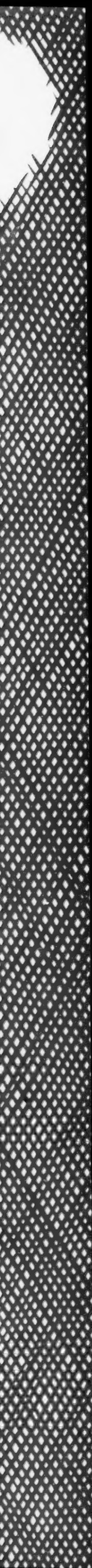


537-44

JEFFREY A-7 HAND HELD DRILL



952-38





DID YOU

That every minute 175 tons of bituminous coal are dumped into coal ovens from which more than 200,000 by-products start.

KNOW?

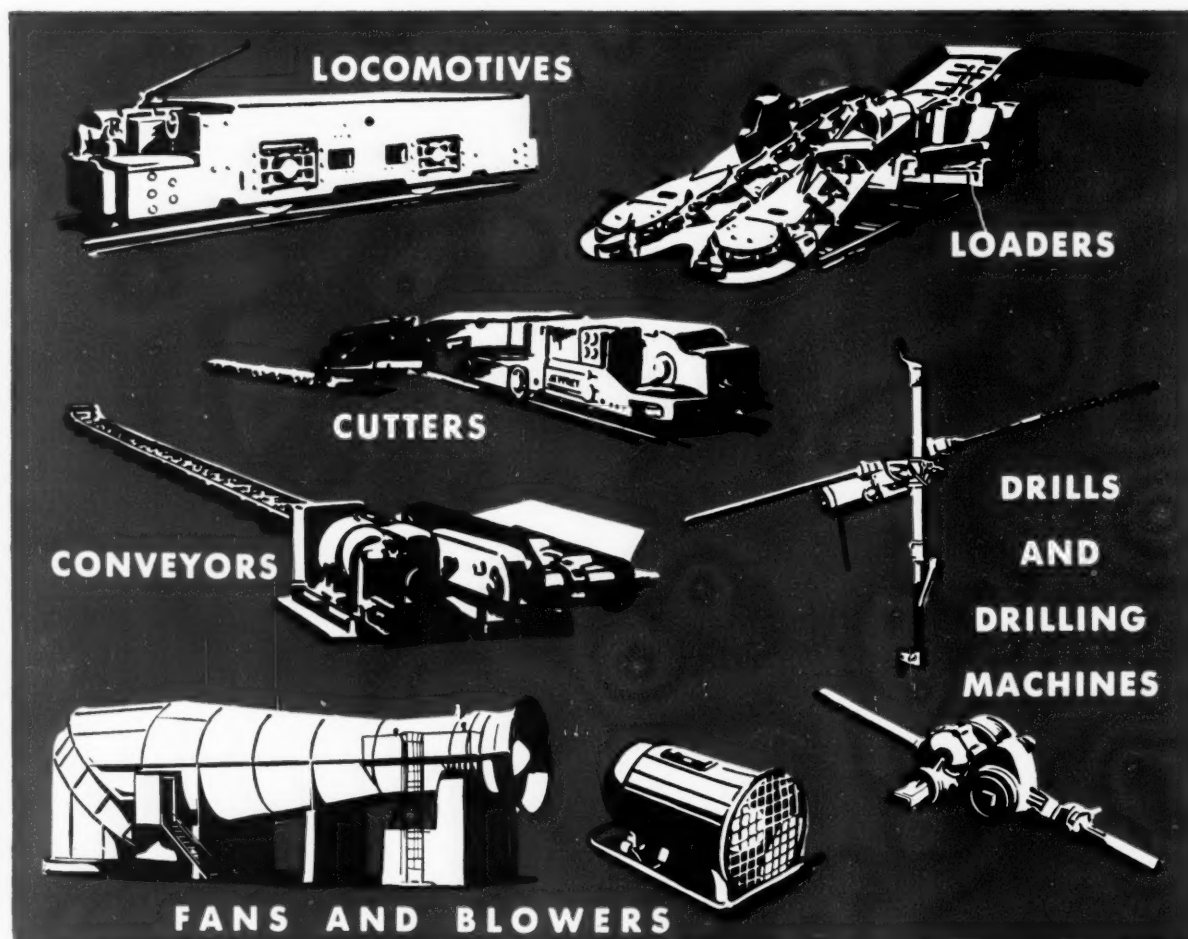
That the feed of the A-6 Drill can be reversed at high speed without reversing the rotation of the auger, thereby insuring a perfect job of cleaning out holes.



Jeffrey

EQUIPMENT FOR COAL MINES

JEFFREY SERVICE TO THE COAL MINES
MEANS SERVICE TO ALL INDUSTRY



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

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Foreign Plants:

Jeffrey Mfg. Co., Ltd.
Montreal, Quebec

British Jeffrey-Diamond, Ltd.
Wakefield, England

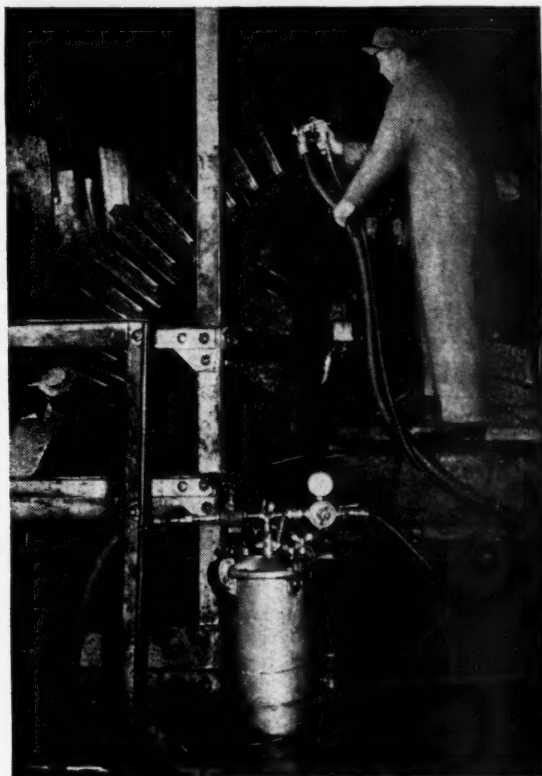
Jeffrey-Galion (Pty), Ltd.
Johannesburg, S. A.

An improved gear lubricant that can be sprayed on gears...

CALUMET Viscous Lubricant

Calumet Viscous Lubricant is not the old type of gear shield usually made from residual products of petroleum. It is a true grease, manufactured from selected soaps and oils plus additives to secure the qualities most needed in a gear shield. In addition, a range of grades is provided, to meet all plant conditions under which gears operate.

That is why Calumet Viscous Lubricant gives the advantages listed above. Because all grades can be applied without heating, and all except the heaviest grade can be sprayed, it cuts application time to the minimum. Spraying also gives a smooth, even coating of lubricant, eliminating



One method of spraying gears is pictured above. Grease under pressure in the tank is carried to the spray gun in the large hose. A separate air hose to the gun provides pressure to break up the grease into a fine spray.

- Saves time in application
- Gives smooth, even film
- Reduces frequency of application
- Reduces throw-off

bare spots or excessive deposits which may drop off before the lubricant is worked into the gears.

An additive in the lubricant gives it improved wetting ability—that's the ability to adhere closely to the metal—so as to give better resistance to water and heat.

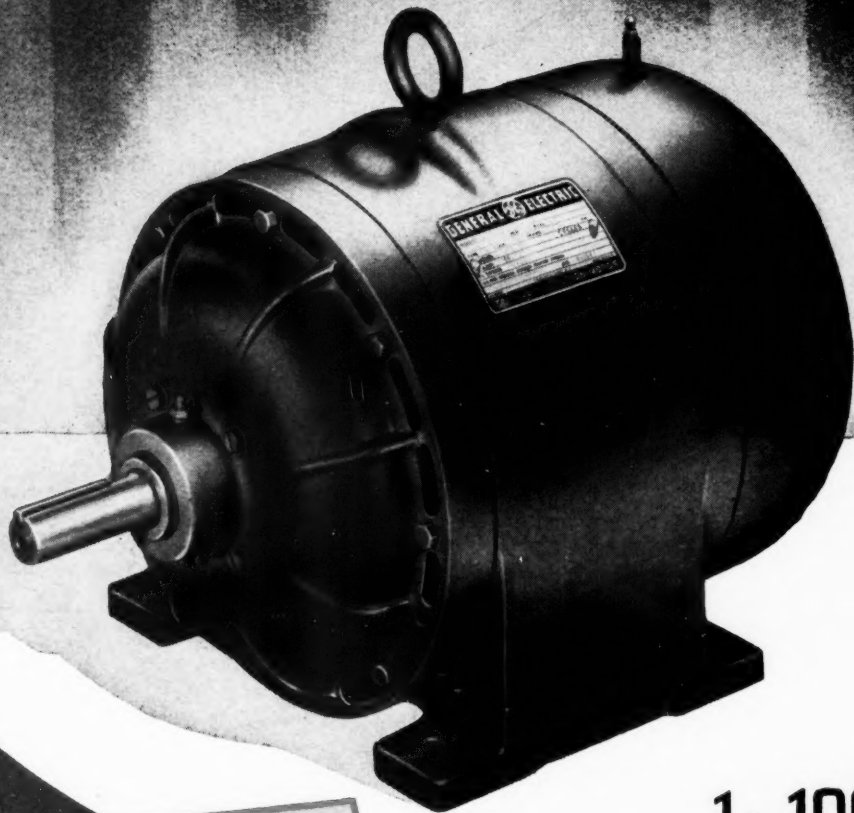
Let this wear-reducing lubricant protect your plant gears. A Standard Oil Lubrication Engineer will survey your plant and help you determine the grades you need and the most economical methods of application.

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)

**STANDARD
SERVICE**

GENERAL ELECTRIC Announces



1 to 1000 hp

COMPLETE ENCLOSURE
FOR PROTECTION
AGAINST DIRT, DUST,
AND WEATHER

NEW

Totally Enclosed

TRI/CLAD MOTORS

REG. U.S. PAT. OFF.

In 1940, G.E. introduced the Tri-Clad open motor—with emphasis on the feature that industry wanted most in a motor, *protection*. Since then, more Tri-Clads have gone into service than any other integral-horse-power motor.

Today, we are ready with a new line of Tri-Clad motors—*totally enclosed, fan-cooled motors*—built on Tri-Clad design principles in both standard and explosion-proof types.

We believe that these are industry's most dependable motors. They are designed specifically for use in many adverse atmospheres—in iron dust, outdoors, in hazardous areas, and chemical atmospheres. Their scope of application is as wide as the field of industrial motor use. Safeguarded against most sources of motor damage, their longer life and lower maintenance will make them economical motors for use on almost every job. General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC





“COAL in these shoes?... Go on...you’re kidding!”

KIDDING, eh? Maybe. But all the same, the leather and leather products industries in this country use *a million tons* of COAL every year. Okay, it takes hides to make leather, and leather to make shoes—but it takes steam and power to make both, and that takes coal!

Think it over—you’ll find COAL a vital element in practically every-

thing you eat, wear, or use—your house, furniture, car—the tobacco you smoke, the books you read, the paper you write on—even your medicine, soap and your wife’s perfume, lipstick, and nylons.

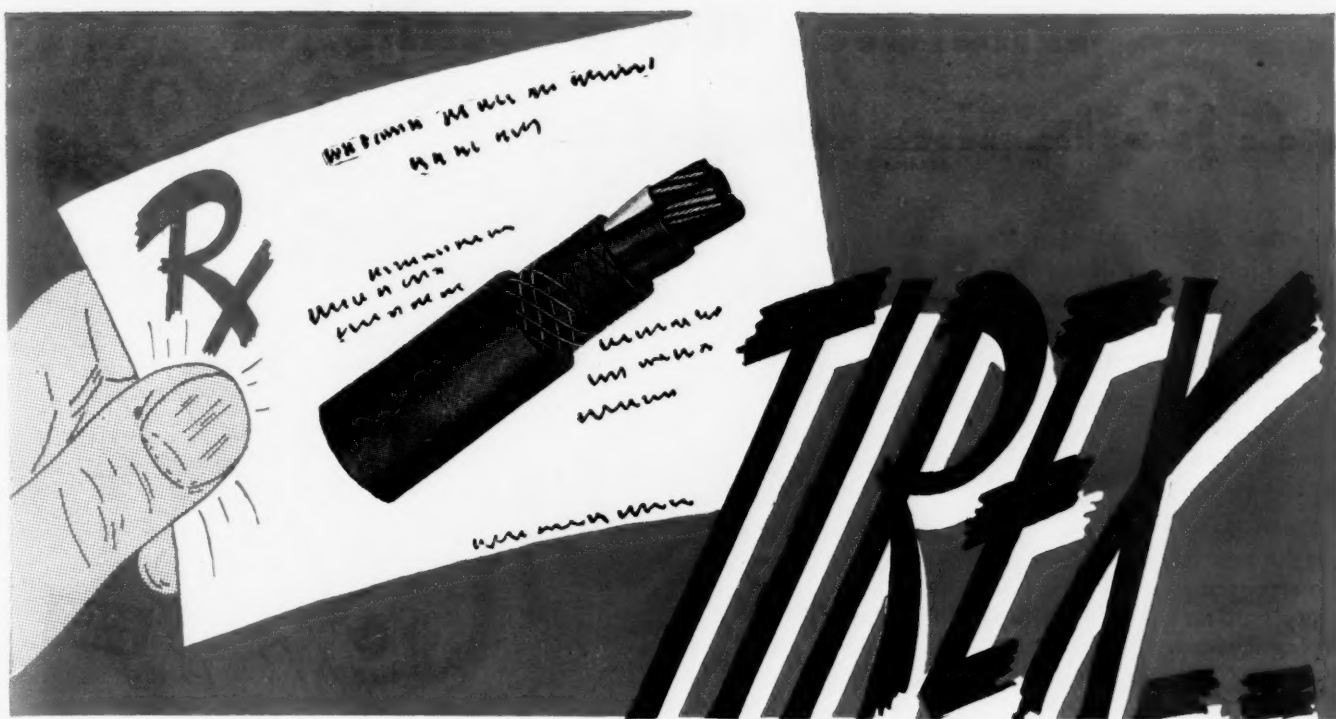
Yes, Chesapeake and Ohio can and does testify to the basic nature of COAL in modern life—its tremendous field in the world today. And

tomorrow this wonderful material will be used more fully and intelligently than ever. Research workers are fascinated by its possibilities.

Chesapeake and Ohio itself is one of the largest users of COAL. When you ship via the Chesapeake and Ohio you can be sure that your coal is hauled by coal-burning locomotives exclusively.

THE CHESAPEAKE AND OHIO RAILWAY

“The 100% Coal Railroad”



OUR REMEDY FOR YOUR CABLE TROUBLES

When wiring problems in your mine give you unnecessary headaches, why not take this simple prescription? Order Simplex-TIREX Cords and Cables.

TIREX comes in a number of different sizes, each designed to meet your specific requirements. From the small 2-conductor Shot Fire Cord to the 4-conductor shielded cables for heavy equipment, each cord and cable is covered with a Selenium Rubber Armor which insures maximum resistance to abrasion, water, and acids. Extreme flexibility allows freedom of operation, and the entire length of TIREX is always ready for use as it will not kink.

Today locomotives, drills, loaders, cutters, and lighting systems are being powered by TIREX in profitable mines the country over. If inefficient cables are curbing your production, call in the Simplex Engineer now for an effective and economical remedy.



Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Whatever the job calls for ... it's in the Crane line

Take this filter installation for example . . . or any piping job. What a difference it makes when you can specify all the piping materials from one line. And when just one order gets you all the valves and fittings, pipe, accessories, and fabricated piping.

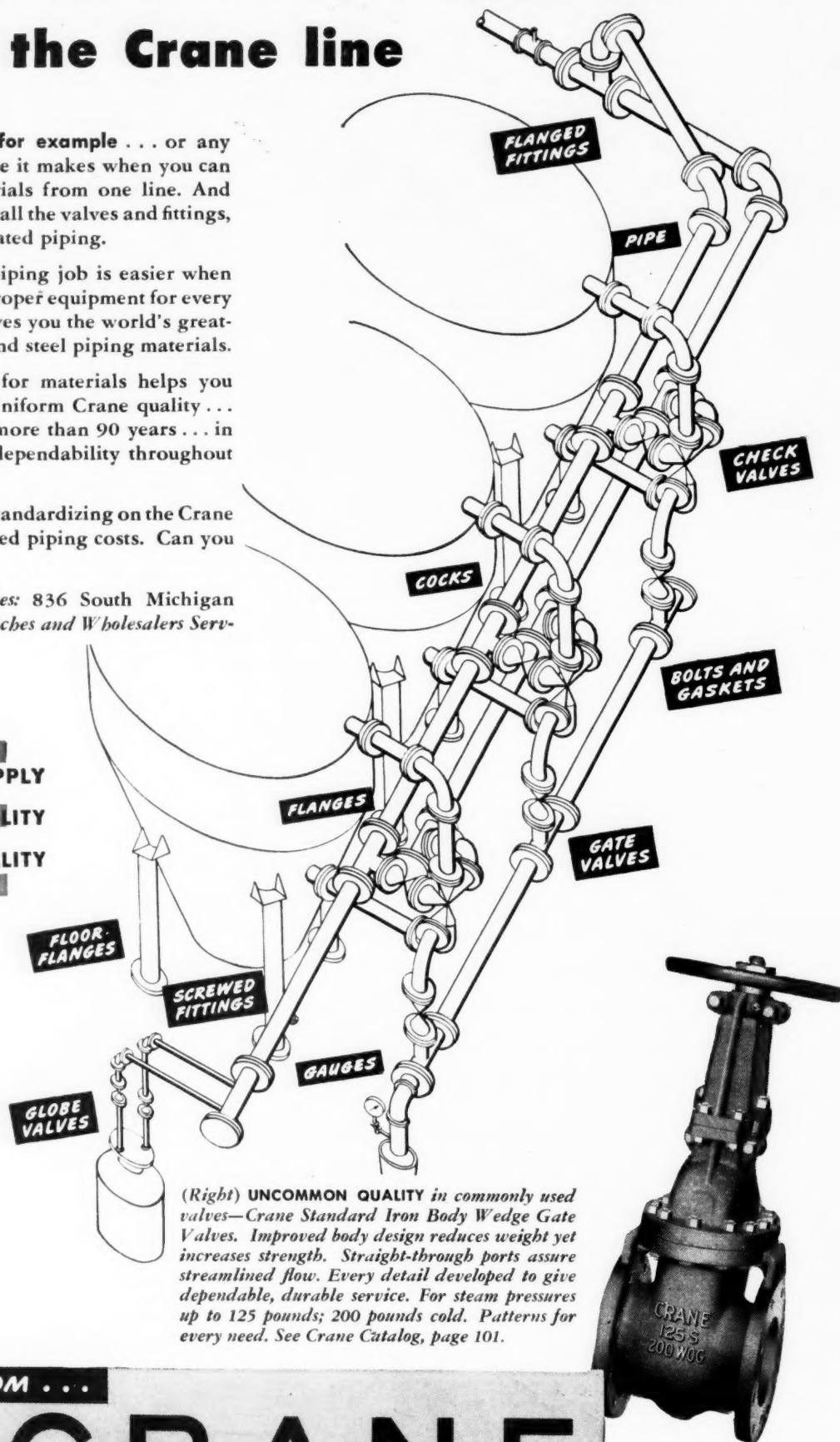
From start to finish, any piping job is easier when Crane is your partner. The proper equipment for every service is assured. Crane gives you the world's greatest selection of brass, iron, and steel piping materials.

Undivided responsibility for materials helps you get the best installations. Uniform Crane quality . . . the standard of quality for more than 90 years . . . in every part means uniform dependability throughout piping systems.

This 3-way advantage of standardizing on the Crane line is the sure way to reduced piping costs. Can you afford to overlook it?

CRANE CO., General Offices: 836 South Michigan Avenue, Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas.

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



(Right) **UNCOMMON QUALITY** in commonly used valves—Crane Standard Iron Body Wedge Gate Valves. Improved body design reduces weight yet increases strength. Straight-through ports assure streamlined flow. Every detail developed to give dependable, durable service. For steam pressures up to 125 pounds; 200 pounds cold. Patterns for every need. See Crane Catalog, page 101.

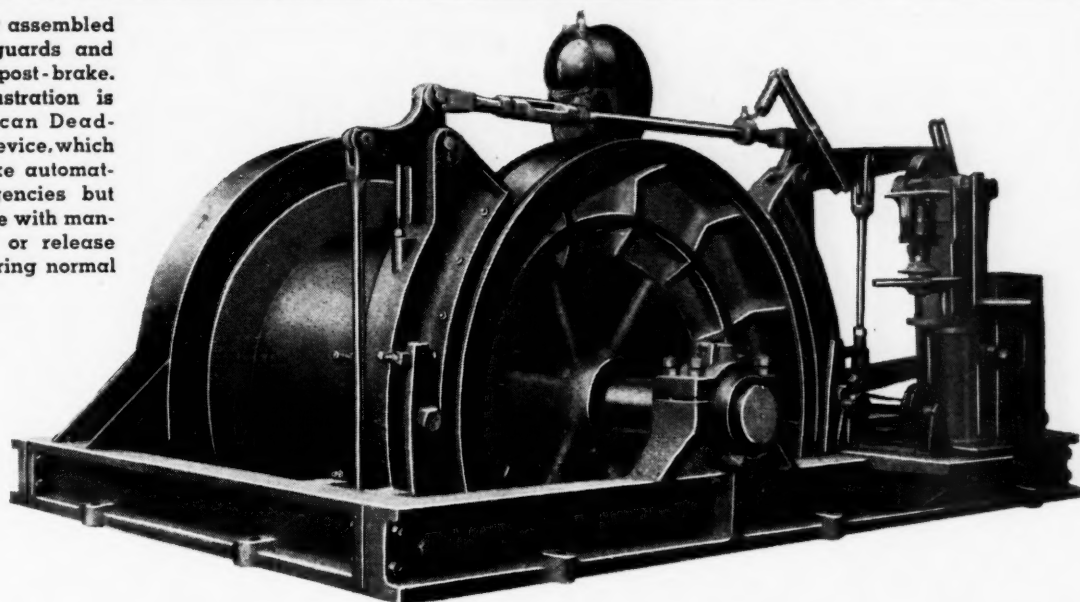
EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

Hoist completely assembled showing gear guards and parallel-motion post-brake. At right of illustration is shown the Vulcan Dead-Weight Safety Device, which applies the brake automatically in emergencies but does not interfere with manual application or release of the brake during normal operation.



This Modern Two-Speed Slope Hoist Solved a Two-Load Problem in a West Virginia Mine

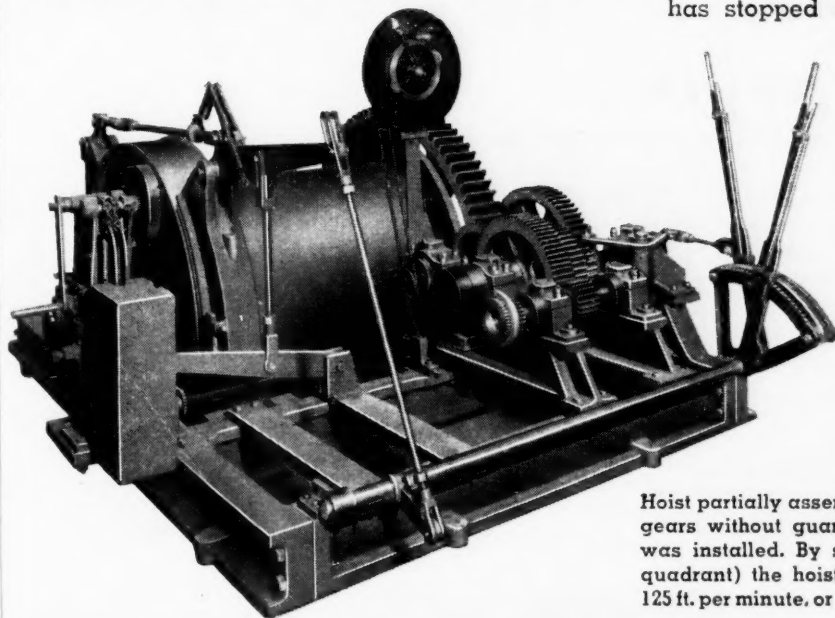
The regular working load is not very great — approximately 12,000 lbs. on a maximum grade of 45 percent — but the hoist must also be able to pull out mine locomotives and other heavy equipment weighing as much as 26,000 lbs. To meet this condition with maximum electrical efficiency and minimum initial expense Vulcan furnished the two-speed hoist here illustrated, which not only fulfills

all operating requirements but is also equipped with thoroughly-proved safety devices providing automatic protection against power-failure, over-travel and over-speeding in either high or low gear.

Safety equipment includes provision for delaying automatic application of the brake, for any reason, until the upward momentum of the load has stopped and it begins to move backward.

Accumulation of slack is thereby prevented — eliminating danger of over-running the rope, or of breaking it if the load falls back rapidly enough to take up the slack with a sudden jerk.

Correspondence regarding any present or prospective requirement for money-saving specially-designed hoists is cordially invited and will receive prompt attention from our experienced engineering executives.



Hoist partially assembled showing double-reduction two-speed gears without guards and before the 65 hp. induction motor was installed. By shifting gears (with lever on right side of quadrant) the hoisting speed can be changed from 500 ft. to 125 ft. per minute, or vice versa, without changing speed of motor.

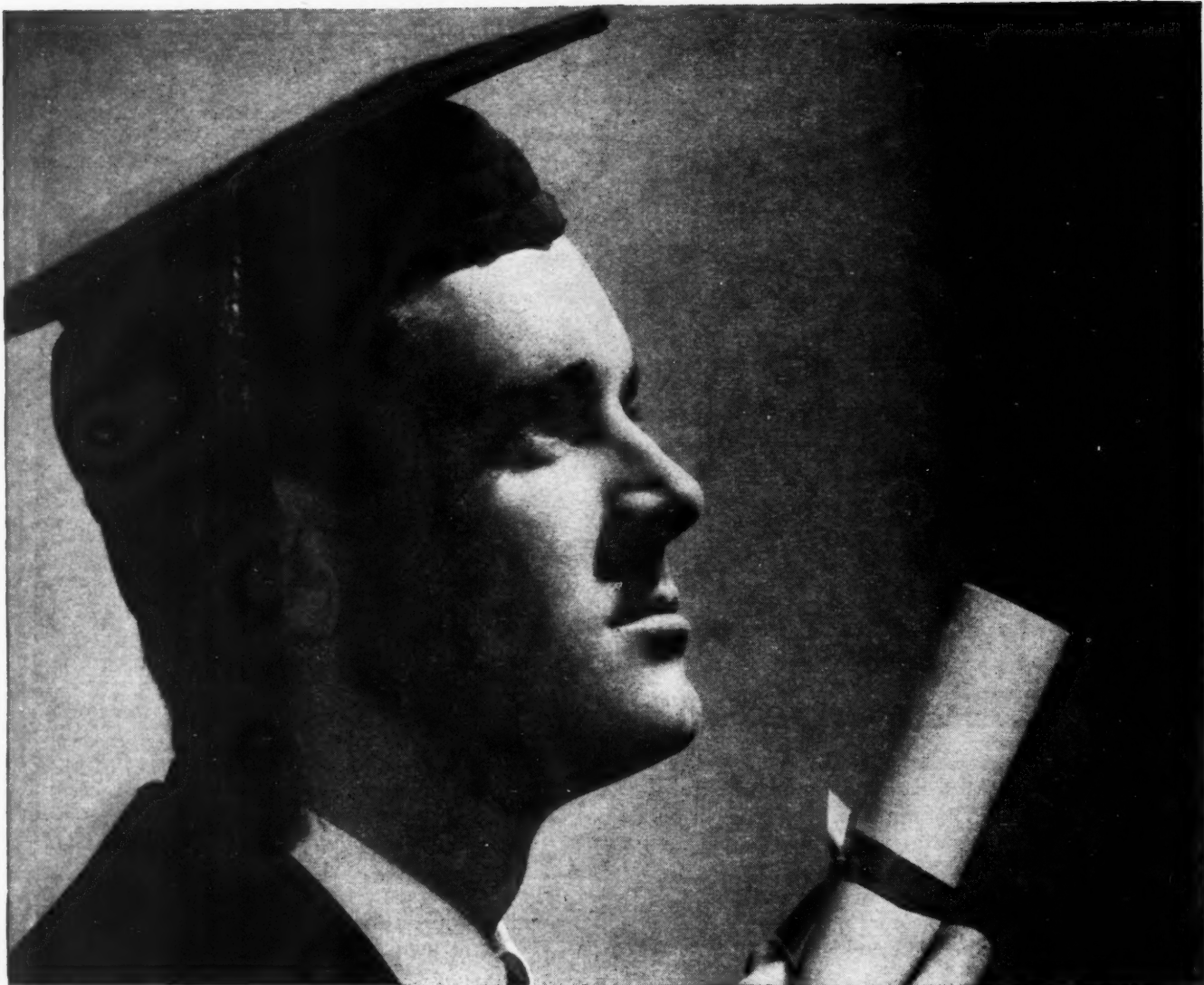
VULCAN IRON WORKS, Wilkes-Barre, Pa.

Heavy-Duty Electric Hoists
Self-Contained Hoists
Scraper Hoists
Car-Spotting Hoists
Room Hoists

Shaking-Chute Conveyors
Chain Conveyors
Cast-Steel Sheaves and Gears
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geared and electric drive

Load-Carrying Larries
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Crushing Rolls and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills



ONLY THE BEGINNING...

Successful completion of his academic career marks only the beginning of an S-A engineer's education. Still to come is the practical knowledge—the "horse sense," if you will—that isn't found in text books.

When you work with an S-A bulk material handling engineer, you work with a man who combines technical training with the broad and varied background that comes only after years of working under actual field conditions. You work with a man who has rubbed elbows with the industry's most progressive group of con-

veyor engineers and who has handled materials under many conditions. You work with a man who has unrestricted choice from a complete line of conveyors and accessories, designed and built by the company that for 45 years has led the field with new units and new methods. You work with a man who can help you convey the *right* volume to the *right* place, at the *lowest* cost per ton . . . over the long term.

If you want the man to whom technical training is only the beginning, talk to an S-A engineer.



STEPHEN S-ADAMSON

2 RIDGEWAY AVENUE, AURORA, ILLINOIS

MFG. CO.

LOS ANGELES, CALIF. • BELLEVILLE, ONT.

Designers and Manufacturers of All Types of
BULK MATERIAL HANDLING EQUIPMENT



DESIGNED FOR LONG SERVICE AND DEPENDABILITY

...BWH CONVEYOR BELTS!

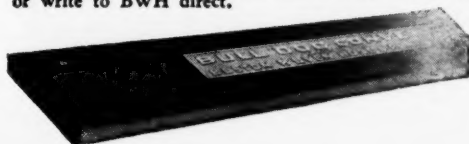
Increased postwar demand for construction materials, coal, and ores will require heavier tonnages than ever before . . . which means heavier strains on mining equipment and especially on conveyor belts.

That's why it will pay you to install a BWH Conveyor Belt. Tough, rugged, dependable, built to stand up day-in and day-out under grueling punishment, BWH will cut maintenance time and costs. Made by the famous ROTOCURE process of continuous vulcanization—which eliminates trouble spots and increases operating life—BWH

Belts have created records for durability. So when you want a conveyor belt that can *take it*, look to BWH for dependable ruggedness . . . BWH distributors for dependable service!

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write to BWH direct.

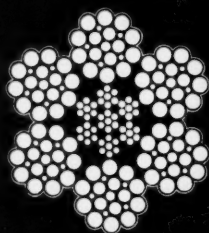


BOSTON WOVEN HOSE & RUBBER COMPANY

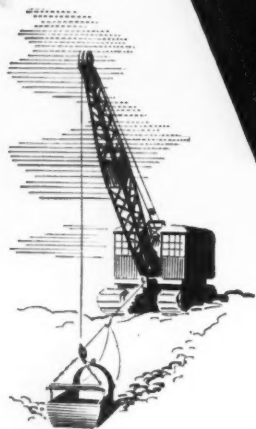
Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

**Best for flexibility—
and long wear!**



UPSON-WALTON 6 x 16 FILLER WIRE CABLE



FOR drag cables on back-fillers and dragline excavators . . . for cargo falls . . . for drag cables on drag scrapers . . . inclined shaft hoists . . . car and slope haulages . . . carry-all scrapers—
wherever you need *BOTH* wear resistance and flexibility to a marked degree, Upson-Walton 6 x 16 Filler Wire Perfection Layrite is the ideal rope for your purpose.

This sturdy cable has *greater abrasion resistance* than

6 x 19 Filler Wire Rope, *greater flexibility* than 6 x 19 Seale. It is more flexible because there are a greater number of wires (21) used in its construction. It is better able to resist abrasion because the outer wires are larger in diameter.

Hemp center or, where operating conditions are very severe, IWRC (independent wire rope center).

Perfection grade—because this finest of all improved plow steels is the strongest, toughest and most resistant to wear of all the grades of wire used to make rope.

Layrite—because this fine preformed wire rope results in longer life, greater safety and greater economy.



Established 1871

Specify Upson-Walton 6 x 16 Filler Wire Perfection Layrite wherever you need greater flexibility combined with longer wear!

Copyright 1946—The Upson-Walton Company

THE UPSON-WALTON COMPANY

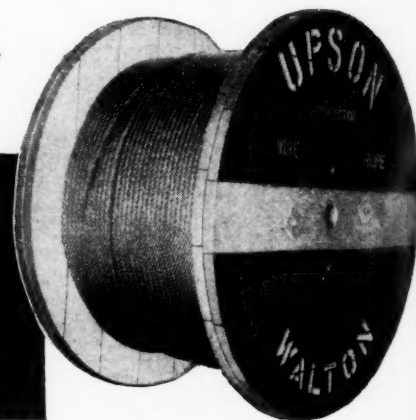
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

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737 W. Van Buren Street
Chicago 7

241 Oliver Building
Pittsburgh 22





SPINNING WHEELS ...keep the odds against you!

You lose

- in traction
- in power
- in tire wear
- in road damage
- in payload
- in delays



WALTER 4-POINT POSITIVE DRIVE *Stops wheel spinning!*

In conventional two and four wheel drive trucks, the wheel that *slips* gets the power—then wastes it spinning and churning its way deeper into the mud.

In contrast, the Walter Four-Point Positive Drive automatically *stops* sending power where it *cannot* be used and puts it where it *can* be used—in the wheels that *have* traction. This is done by three automatic locking differentials. They arrest wheel spinning by proportioning the power to the **FOUR** driving wheels according to their traction at any instant.

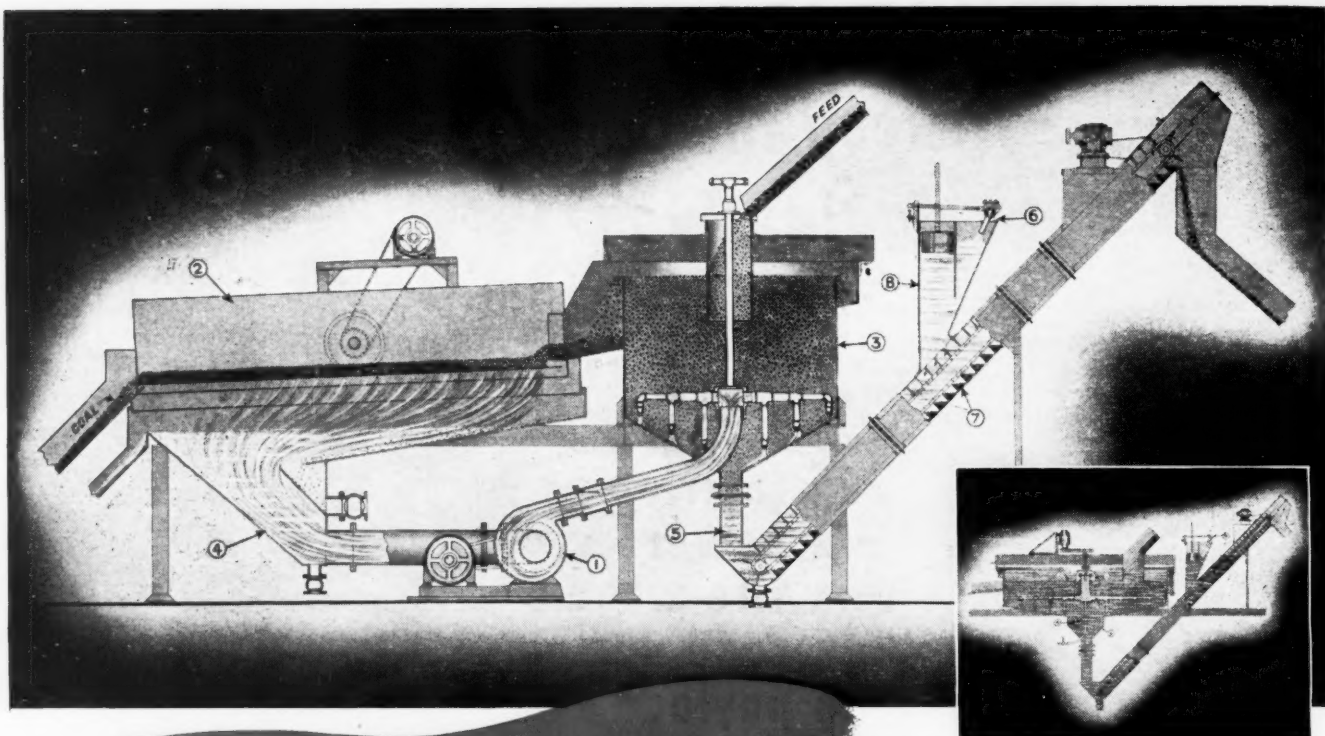
That is why Walter Tractor Trucks haul in bad weather when other trucks are stopped or stalled—why they haul enormous loads through soft dirt, deep mud, up steep grades and over slippery surfaces. That's why they do not grind tires or gouge roads. That's why they carry bigger payloads in open pit mining, strip mining and off-the-road hauling, faster than any other truck. Get the complete story about these unique trucks, today. They can save money on *your* jobs, too.



WALTER
TRACTOR TRUCKS

WALTER MOTOR TRUCK CO.

1001-19 Irving Avenue
Ridgewood 27, Queens, L.I., N.Y.



FULLY AUTOMATIC Coal Cleaning *for your smaller sizes*

R & S HYDROTATOR PROCESS using the proven hindered settling principle is a simple and economical way to wash your coal—at the same time achieving profitable tonnage.

Raw coal is passed through a circulating fluid medium in which the gravity of the fluid is automatically built up and maintained so that the coal floats away from the refuse and is delivered over a dewatering screen.

The basic Hydrotator principle is in the agitator which flows water into a cylindrical tank with uniform upward current. There are no dead spots, hence absolute suspension of solids can be maintained regardless of tank area.

Fully automatic, the process spares vital labor and saves power.

Dry Cleaning coal where desirable is efficient and economical in the R & S Stump Air-Flow Cleaner. Described in Bulletin No. 163.

Coarse coal can be prepared economically with the popular R & S Hydro-Separators, another R & S engineering achievement used in many profitable installations. Ask for Bulletin No. 161.

West Kentucky Coal Co.,
North Diamond Mine, Earlington
Kentucky cleans 80 tons per hour
of $\frac{1}{4}$ " x 0 coal in one 6 ft. Hydro-
tator Process Unit and one 12 ft.
Hydrotator Classifier unit. Coarse
coal is cleaned in R & S Hydro-
Separators. Centrifugal dryers are
used for mechanically drying the
fine coal.



ROBERTS and SCHAEFER CO.

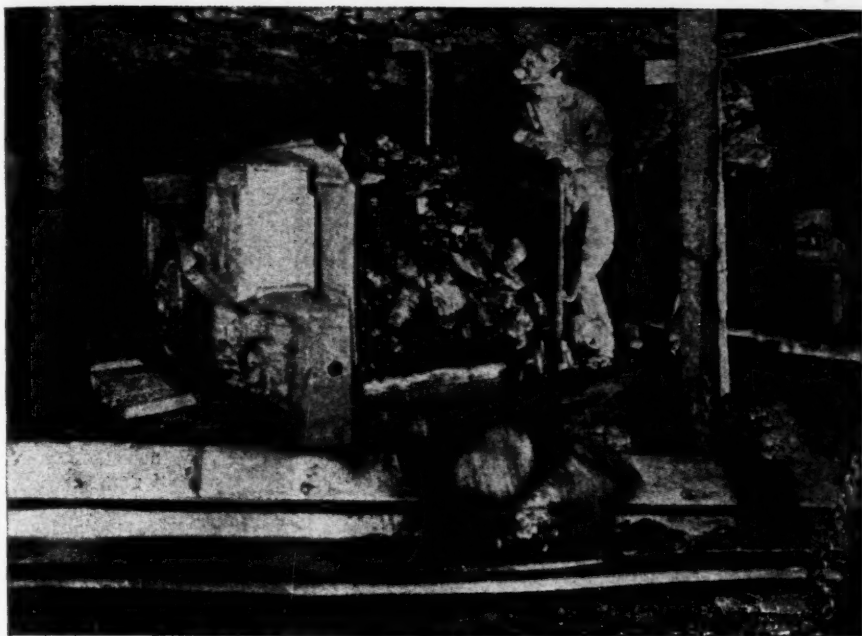
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BATTERY-POWERED Shuttle Cars

**Give Most
Flexible
Operation**



... ALKALINE BATTERIES give most trouble-free power

Because they carry their own power supply, battery-operated shuttle cars have high operating flexibility. They require no external power connections to jeopardize safety, require maintenance, or delay production while being connected or disconnected and during the roundabout maneuvering often necessary to avoid running over them. Because they have a minimum of moving parts, they are easiest to keep in working order.

With batteries exchanged between shifts, a shuttle car is kept continuously supplied with power. While one battery operates the car, the other is charged. Not only does the car make efficient use of power but the current for battery charging is low-cost power because charging can usually be done during off-peak hours. In that case, a substantial reduction in maximum power demand is also effected.

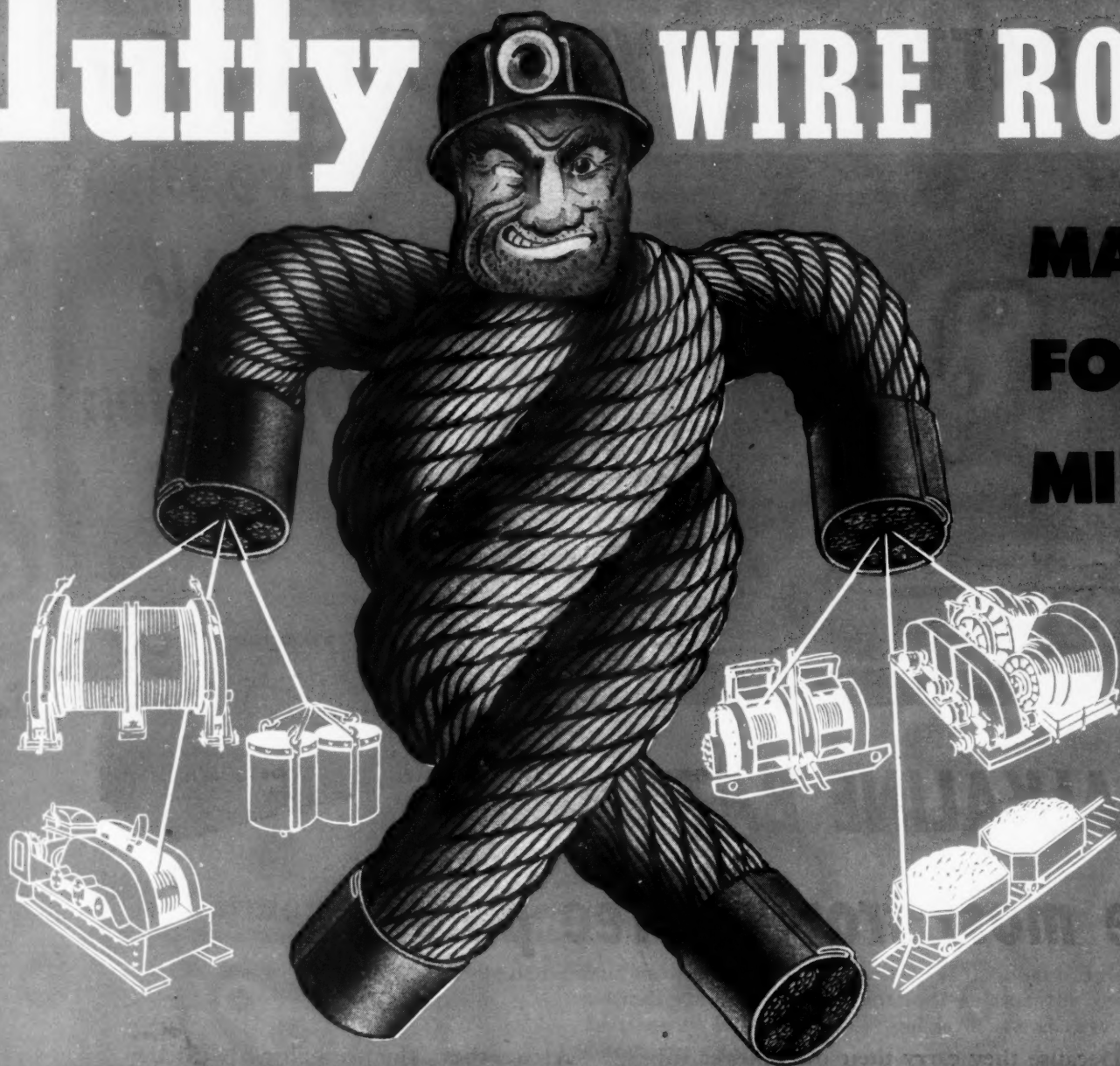
Altogether, the superior flexibility, higher availability, and overall operating and maintenance economy of the battery-powered shuttle car make it an inherently dependable and efficient haulage unit—especially when powered by Edison Alkaline Batteries. With steel cell construction, an alkaline electrolyte that is a preservative of steel, and a fool-proof electrochemical principle of operation, they are the most durable, the longest-lived and most trouble-free of all mine-haulage batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Co., Ltd., Montreal and Toronto.

Edison

ALKALINE BATTERIES

Tuffy WIRE ROPE

**MADE
FOR
MINING**



MINING MACHINE ROPES* CRAB MOTOR ROPES* WINCH ROPES*

... and a wide scope of other special wire ropes to fit every mining requirement. Union Wire Rope's exacting engineering standards "Fit" wire ropes to the function they are to perform. Experienced wire rope craftsmen, the finest precision machinery and production techniques are employed to carry out these standards and afford the fullest measure of wire rope stamina, dependability and economy. Write for new folder on Union Mining Machine Rope.



union

Wire Rope

*UNION-FORMED (Preformed) Wire Rope

UNION WIRE ROPE CORPORATION

2130 Manchester Avenue

Kansas City 3, Miss.

Tulsa 3 Houston 11 Chicago 6 Salt Lake City 13 New Orleans
Monahans, Tex. Portland 10, Ore. Ashland, Ky. Adams

"TUFFY"
MACHINE
Have Climb
To Afford
Easy Install

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NO



"TUFFY"
MACHINE
Have Clips
To Afford
Easy Instal

ORATION
3, Min
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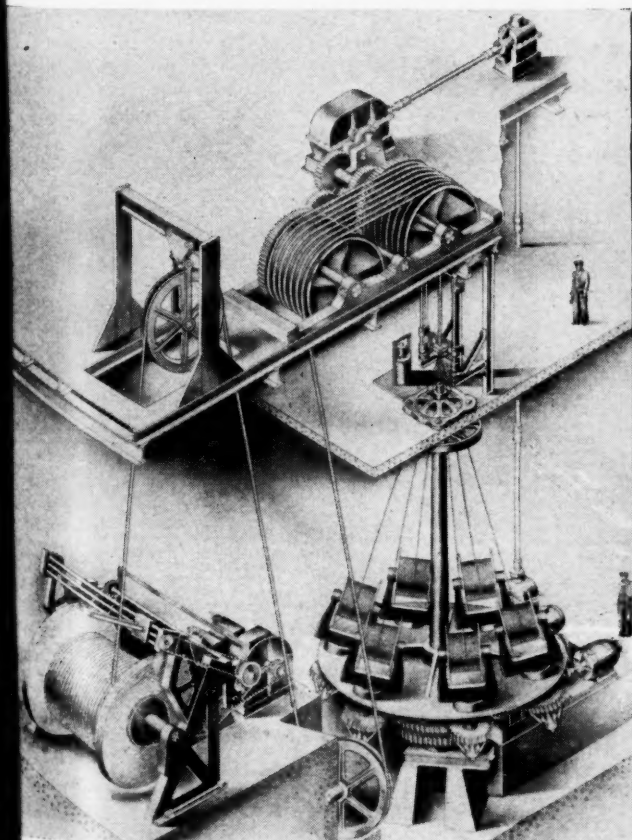
Proved the Best FOR SLUSHER LOADING

This New, 3 STRAND $\frac{5}{8}$ " 3x19
Was Specially Designed By Union
Wire Rope Engineers To Better
Withstand The "Rope-Killing"
Conditions of Slusher Mining.



Since 1943 the Union Wire Rope Corporation has been furnishing the $\frac{5}{8}$ " 3x19 ropes for slusher loading. At the end of 1944, Union engineers made a study of the service these ropes had given under actual operations. As a result, further improvements were made and rope cost cut.

This new improved $\frac{5}{8}$ " 3x19 is so engineered that it now gives maximum resistance to abrasion, is rigid, non-collapsing to eliminate drum crushing, yet it retains adequate elasticity and flexibility to take up shock loads. Write for special Slusher Rope folder.



Illustrated at the left is Union Wire Rope's giant 4-story closing machine, capable of producing 27 tons of wire rope in one continuous length. It has a range of $\frac{3}{4}$ " to 4" diameter to fulfill many wire rope needs such as those of the mammoth strip shovel pictured above.

Write for new Mining Rope folder.



union
Wire Rope

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

FOR MORE AND

BETTER OUTPUT WITH

ALL MECHANIZED EQUIPMENT

The value of CARDOX in making the most of mechanized equipment extends over practically every phase of production. Longer cutter bars can be used when the face is broken down with CARDOX... providing more coal per face for the loading machine. Loading is faster... and the loader is subjected to less wear... because the slow heaving action of CARDOX rolls the coal forward in a loose pile. The higher percentage of coarse sizes produced by the gentle heaving action of CARDOX makes possible substantial savings in cleaning time and cost. ¶ The CARDOX Mining method involves no radically new procedure. In fact, it makes possible maximum output with a minimum of skill and manpower. Write for full details on free demonstration in your own mine.

CARDOX

Hardseam Drilling Equipment

Complete line of drilling equipment designed to give you the maximum in drilling efficiency

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS





This emblem identifies the nation's largest company-owned truck-service organization—International Branches—and International Truck Dealers everywhere.

5 Reasons Why INTERNATIONAL SERVICE Can Help You Meet Rising Truck Operating Costs

1. Mechanics who furnish International Service are *truck* mechanics—specialists in truck service.
2. They are trained in International shop methods.
3. They are kept constantly informed of all improvements in maintenance and service practices.
4. They use International-approved equipment for analysis and testing.
5. They install International factory-engineered parts.

International Truck Service is supplied by a national network of International Truck Dealers and

by International Branches—the nation's largest company-owned truck-service organization. It is available for trucks of all makes and models.

In the present critical truck situation, International Truck Service is your best bet to keep operating costs at practical levels and to minimize chances of highway failures. You will find an International Branch or Truck Dealer within easy driving distance. Get in touch with him today.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois



Listen to "Harvest of Stars" every Sunday. NBC Network



INTERNATIONAL Trucks



A Gold Mine of Inspiration

FOR COAL MINE EXECUTIVES

A first edition 66-page book full of facts, pictures, and data about the advantages of coal preparation . . . a veritable gold mine of inspiration! For example, it relates how a coal mine executive had a profit-making idea and illustrates what he did to bring it to life. It illustrates how numerous other coal mine executives had ideas for their properties and what they did about them . . . how they really turned coal into gold by supplying a hungry market with better fuel.

Natural life illustrations of equipment in full color and cut away to demonstrate how the coal is separated from impurities, screened and dried, show graphically how coals are converted into specification fuel.

"New Horizons for Coal" is the title of this book. It prophetically points to the new vistas for prepared coal that lie ahead . . . of coal separated from its impurities to be developed by industry into coal that will produce cool comfort when summer sun shines as well as

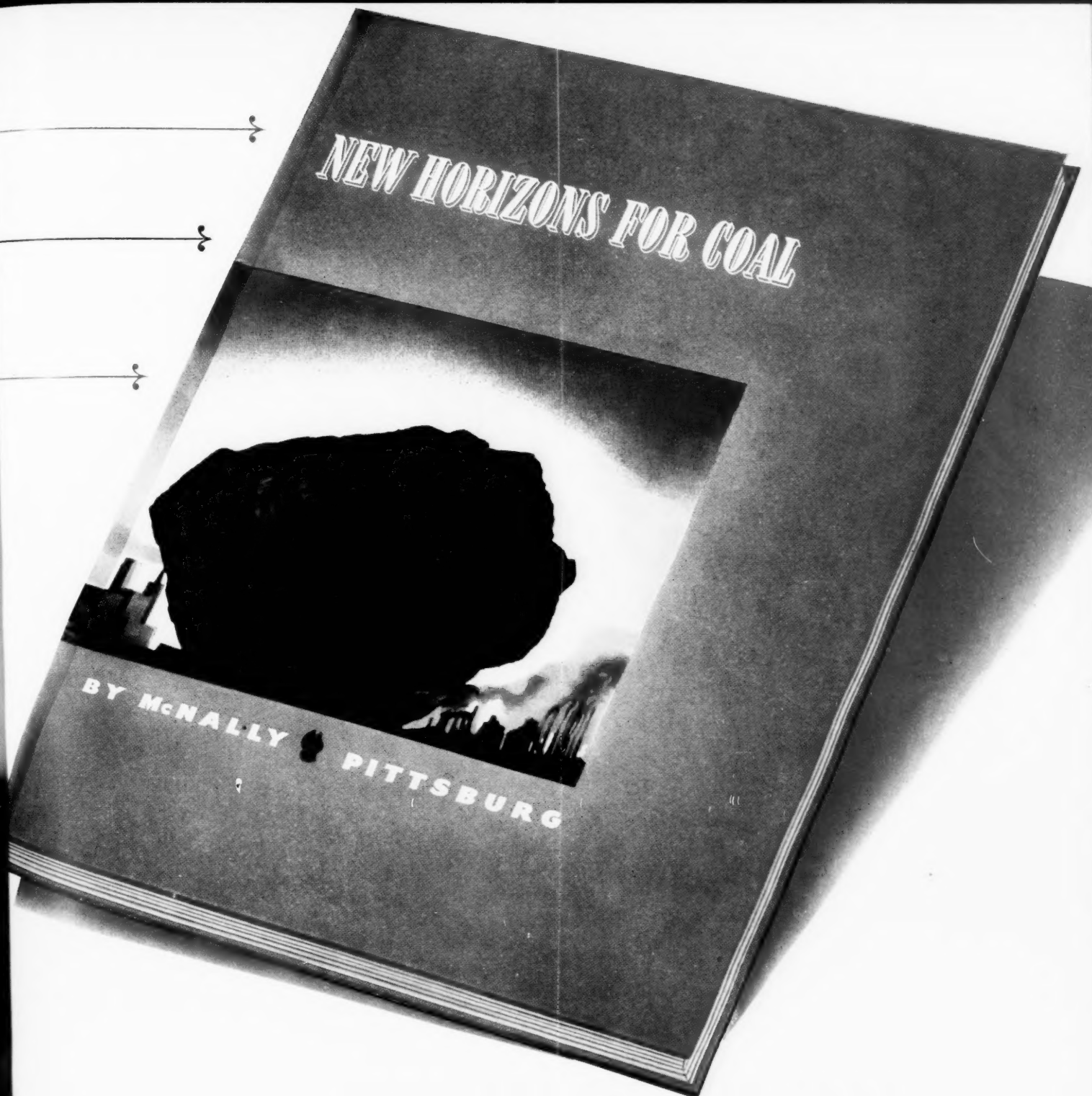
warmth for winter days; coal from which new medicines will be released for the prevention of disease and to increase longevity; coal that will resolve itself into the sheen of silks, the fragrance of flowers, the flavor of fruits; coal that will give colors in the artist's palette to be molded and matched into useful plastic beauty.

Executives of coal mining companies have already received their copies. If we have overlooked anyone who should have this book, or if banking officials or others who have an interest in coal mining properties would like to have a copy, we shall be glad to deliver one, when requested on official stationery.

M'NALLY PITTSBURG

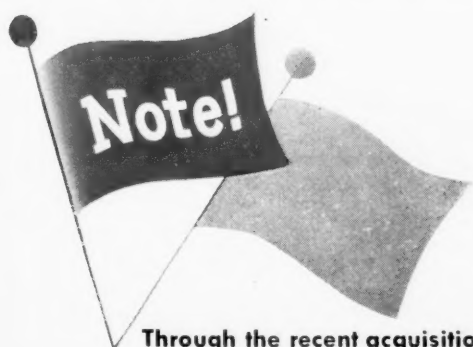
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL





**IN CASE YOU HAVE NOT RECEIVED YOURS . . .
WRITE FOR IT on Your Company Letterhead**

Address your request to McNally Pittsburgh Mfg. Corp. and mail it to the office nearest to you.



M'NALLY  PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

Through the recent acquisition of The Morrow Manufacturing Company of Wellston, Ohio, operating as a subsidiary, all facilities of both plants are available to the coal industry.

Engineering & Sales Offices: Pittsburg, Kans.; Chicago (1), Ill.; Pittsburgh (22), Penna.; Columbus, Ohio; Wellston, Ohio; Caixa Postal 1310, Rio de Janeiro, Brazil



Shock Loads **WON'T BRUISE** **OUT THIS HEAVY-DUTY ROCK HAULER**

Designed for heavy-duty rock hauling, the Dump-tor can take its 6-yard capacity load in one chunk — and like it! No wonder then that it stays on the job longer, does the everyday tasks with less time out for overhauling. Strong steel channels reinforce the gravity dump body. 18:00 x 20 drive wheel tires cushion rock shocks. Alloy steel drive axles are heat strengthened. Oscillating front axles, heavily sprung, take the twists out of haul road travel. Heavy frame is well braced. Cast steel housings protect rear axle and transmission.



ASK FOR YOUR DUMPTOR
CATALOG TODAY

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN



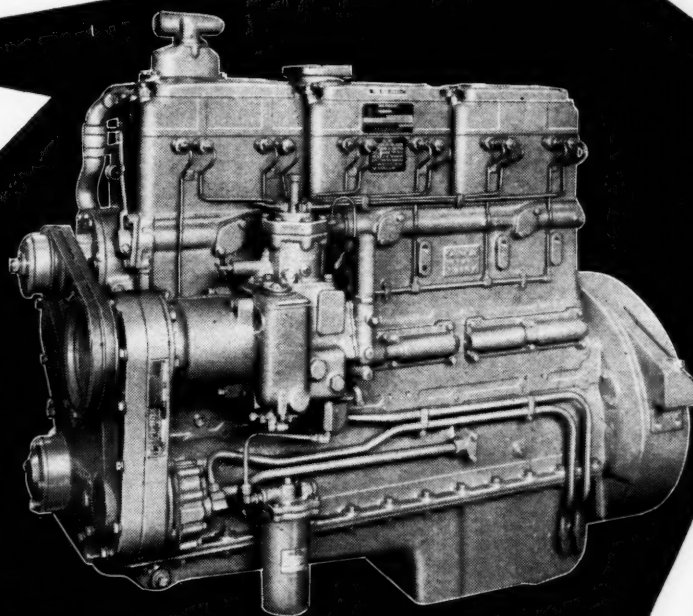
HEAVY-DUTY CONSTRUCTION EQUIPMENT

**Properly Rated . . . Properly Applied,
Cummins Diesels Set the Pace in
Dependability and Low-Cost Power!**

CUMMINS
Dependable
DIESELS



SINCE 1918...PIONEER OF PROFITABLE POWER
THROUGH HIGH SPEED DIESELS



CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA



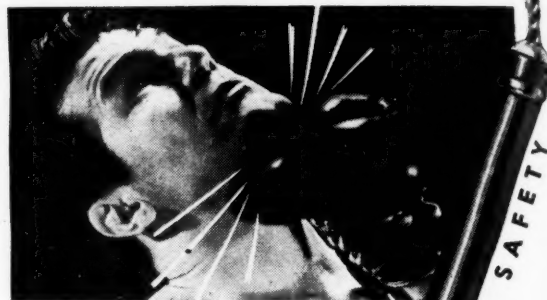
*Blast More Rock
Save More Coal
Reduce Vibration*

Use **ATLAS ROCKMASTER**

It's the first really new blasting development since the war, and according to news from many enthusiastic users, it is improving stripping operations in at least three ways:

First, Atlas Rockmaster has definitely increased rock fragmentation in many cases—some operators report shovel efficiency increased by at least 30 percent! Second, where conditions are right, it may be used to help save the coal from pulverization. Third, thanks to its new and faster system of timing control, it muffles noise, reduces vibration.

Atlas does not claim Rockmaster to be the answer to *every* coal stripping problem. But with your knowledge of the operation, and our knowledge of explosives, it is more likely than not to give sensational results. Let the Atlas representative give you all the facts. Remember, Atlas Rockmaster also offers you



Two powerful jabs in quick succession accomplish what no single blow could do. Atlas applies this principle of the one-two punch to the Rockmaster Blasting System. Result: better rock fragmentation, less damage to underlying coal, reduction in noise and vibration!

The Greater Safety of
**ATLAS MANASITE
DETONATORS**



ATLAS EXPLOSIVES
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

... AND GET ME SOME MORE BETHLEHEM No. 5 STEEL TIES

Most of the time that's what happens after the first trial order. For in room track, Bethlehem No. 5's are trouble-savers, time-savers. Much less costly, too, in the long run.

Steel ties mean stouter, more durable track; speedier placing of cars; fewer derailments. Track cannot spread, for the ties are equipped with sturdy riveted clips that maintain accurate gage.

On a dollars-and-cents basis, No. 5's more than justify their use. Being of steel, they can't rot out. They cannot be spike-killed. Many have been installed, taken up, and reused 25 times or more.

If you're looking for genuine savings—and who isn't?—find out more about these rugged steel ties.



*How Bethlehem No. 5's
answer 5 different needs*

★ Simple to install. Merely a matter of tapping four clips into place.

★ No spiking, no gaging. The clips do it all.

★ Rigid and strong, yet light and easy to carry. Weigh only 5 pounds per foot.

★ Built specifically for 40-pound rail; handle the full weight of your heaviest cutting and loading equipment.

★ Furnished as shown or in the long-lived Ar-Moored* Tie, made by Koppers Company Inc., Wood Preserving Division. The Ar-Moored Tie, which is particularly suitable for secondary haulage track, consists of a Bethlehem steel tie attached to a preformed and pressure-creosoted wooden base.

* Trademark



A MESSAGE TO THE COAL INDUSTRY

10 BIG ADVANTAGES OFFERED INDUSTRY IN THE "UNION PACIFIC WEST"

- 1 AVAILABILITY OF RAW MATERIALS
- 2 ADEQUATE SOURCES OF POWER
- 3 OPPORTUNITY FOR DECENTRALIZATION
- 4 NON-RESTRICTIVE LEGISLATION
- 5 LARGELY NATIVE-BORN LABOR AVAILABLE
- 6 HEALTHY LIVING CONDITIONS
- 7 GOOD SCHOOLS
- 8 GROWING CONSUMER MARKETS
- 9 INCREASING INDUSTRIAL DEVELOPMENT
- 10 FAVORABLE DISTRIBUTION FACILITIES*

*

Union Pacific—the Strategic Middle Route—unites the East with the Mid-West, Intermountain and Pacific Coast states.

It has facilities and equipment designed to meet industry's heaviest demands. Trained traffic men offer a helpful, cooperative service to all shippers.

For information regarding western industrial sites, write W. H. HULSIZER, General Manager of Properties, Department 101, Union Pacific Railroad, Omaha 2, Nebraska.

be Specific -
say "Union Pacific"



YOUR OWN PRIVATE ROADWAY

-open the year round!



EASY TO INSTALL . . .

ECONOMICAL TO OPERATE . . .

AN American Aerial Tramway provides a direct, all-weather route to your mine, however remote or inaccessible its location.

Independent of the contour of the ground and requiring no bridges, trestles, or tunnels, aerial tramways can be installed and operated easily and economically over the most rugged terrain . . . in all kinds of weather. Even over comparatively level ground, this modern method of

transportation has been proved economically sound.

In general, the cost-per-ton-mile of transporting coal and mine waste from point of loading to point of discharge is less than by any other method. The heavier the tonnage handled, the more profitable becomes the operation.

U·S·S American Aerial Tramways have been built from a few hundred feet to many miles in length, and

with capacities ranging from 1½ tons to 300 tons hourly.

As one of the world's leading manufacturers of aerial tramways, we are in position to furnish you with a transportation system exactly suited to your needs.

Our engineers will be glad to discuss U·S·S American Aerial Tramways with you at anytime. Recommendations will be made only after a study of your problems.

LISTEN TO
the "Hour of Mystery" presented by United States Steel on the radio every Sunday evening. Consult your local newspaper for time and station.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

U·S·S American Aerial Tramways



Here's an important fact

GATES Standard VULCO ROPES are **TODAY** Outwearing any V-Belts Ever Built Before!

The simple fact that during the war our Army's tanks, tractors and self-propelled big guns required V-belts of a strength and durability never thought possible before is bringing substantial benefits to Gates V-belt users today. That is because Gates developed these greatly superior V-belts for our combat units—and here is why this fact is now important to YOU:--

with this simple reason behind it

Every improvement developed by Gates for U. S. Combat Units—and many later improvements, also—have been added, day by day, to the quality of the Standard Gates Vulco Ropes which have been delivered to you.

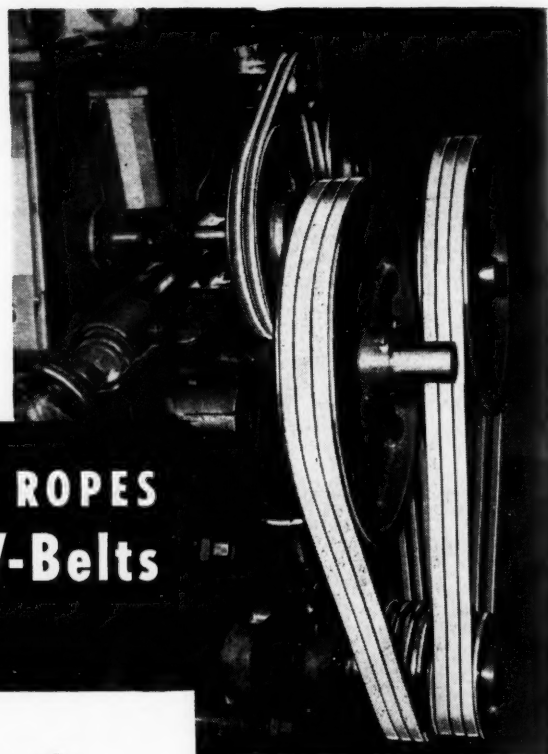
As a result, long before the war was over, you were getting in your Standard Gates Vulco Ropes a product built to far higher service standards than any V-belts ever built by anyone before the war.

And the improvement by no means ended there. Through continuing *specialized* research, the service qualities of these superior Gates Vulco Ropes have been still further improved as all of Gates facilities and energies have been returned to the service of industry.

These are the simple reasons why the standard Gates Vulco Ropes you are getting today are delivering far better service than any V-belts ever built before!

THE GATES RUBBER COMPANY
DENVER, Colorado

World's Largest Makers of V-Belts



All Gates
V-Belts are
Built With
The Patented
**CONCAVE
SIDE**



THE MARK OF SPECIALIZED RESEARCH

GATES VULCO ROPE DRIVES

Engineering Offices
and Jobber Stocks

IN ALL INDUSTRIAL CENTERS

of the U. S. and
71 Foreign Countries

Solving TOMORROW'S PROBLEMS

GOULD RESEARCH IS CONSTANT, SO LOOK
TO GOULD FOR LEADERSHIP!

in the new Gould research laboratory there is an electric spark that is bringing you better batteries. It is part of a modern spectroscope used to determine the purity of metals.

Samples of lead, burnt in this spark, are spectroscopically photographed and the resulting film inserted in the densitometer shown below. This machine can identify and accurately measure the presence of less than one thousandth of

one per cent of any foreign substance.

These instruments are but two of the many new research tools in use in the Gould laboratory. Under the skilled direction of Gould engineers they are making storage battery construction an exact science.

For further information about this new research laboratory write Dept. 116, Gould Storage Battery Corporation, Depew, New York.

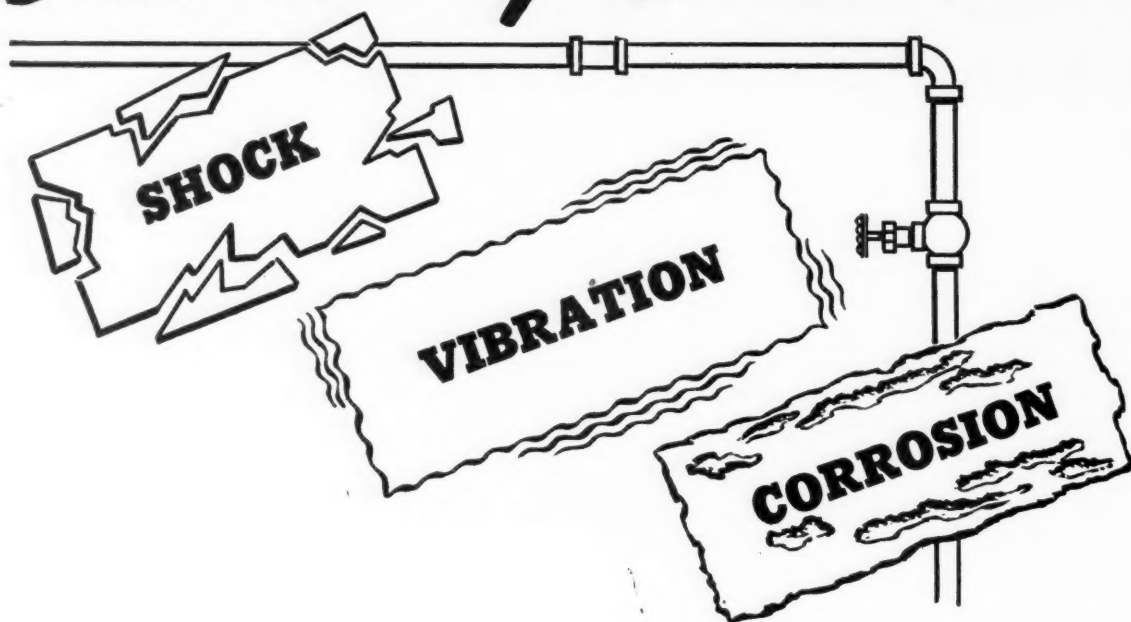


Gould makes storage
batteries for
Industrial Trucks
and Tractors
Mine Locomotives
Mine Shuttle Cars
Aircraft
Marine Services
Diesel Locomotives
Railway Car Lighting
and Air Conditioning
Railway Signals
and
All Stationary
Applications

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.
Service Centers: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland
Detroit • Kansas City • Los Angeles • New York • Philadelphia • Pittsburgh
Portland • St. Louis • St. Paul • San Francisco

GOULD
KATHANODE and
Plante BATTERIES

End the Triple Menace ^{TO} COPPER TUBE AND BRASS PIPE LINES



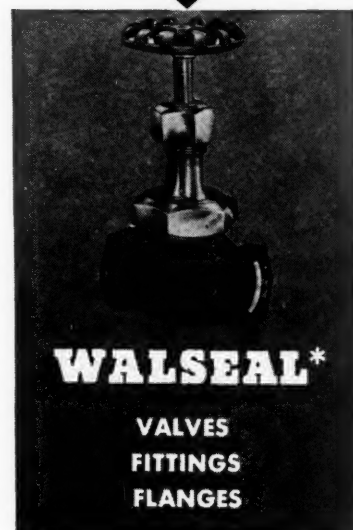
with **THREADLESS SILBRAZ* JOINTS**

Shock! Vibration! Corrosion! Yes, a Silbraz Joint made with Walseal* valves, fittings and flanges "has what it takes" to overcome this triple threat to copper tube (iron pipe size) and brass pipe lines — and for keeps.

Why? Because patented Walseal valves, fittings and flanges get their *extra* stamina from a ring of silver brazing alloy built right into each port... an alloy that when heated with an oxyacetylene torch flows out between the pipe wall and the fitting, making a joint that is stronger than the tube or pipe itself.

In thousands of installations, these Walseal products have proved beyond dispute that they make a "one piece pipe line"... a pipe line that does not creep or pull apart under any shock, vibration or temperature to which the copper tube or brass pipe can be safely subjected.

Write today to Dept. 84 for Catalog 42 giving complete data on Walseal products, as well as on the entire Walworth line.



Make it a "one-piece pipe line" with **WALSEAL**

WALWORTH

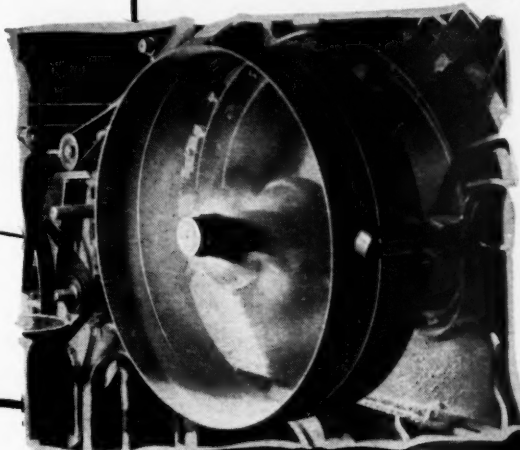
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

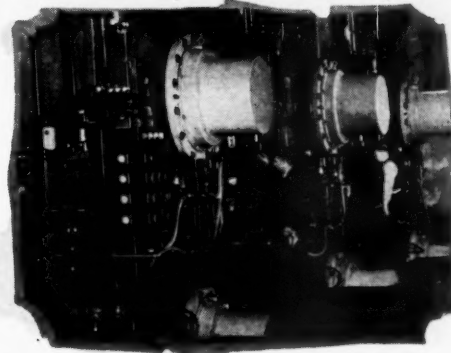
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

*Patented — Reg. U.S. Patent Office

"Bearings **RUN 10% COOLER**



SINCE CHANGING TO *Tycol* **industrial Greases"**



**Production speeded 65%...
Repair costs slashed 30%...
Deposits eliminated...
Highly stable—doesn't leak...
Consumption cut 25%...**

This report from a plant engineer typifies the kind of trouble-free, cost-cutting lubrication provided by Tycol Industrial greases. They contain more high-grade cylinder oil — less soap — which means better performance in every application.

For aid in the selection of Tycol greases best suited for your particular needs, contact your nearest Tide Water Associated office today.

LUBRICATION—"ENGINEERED TO FIT THE JOB"

COAL AGE • June, 1946



**Boston • Charlotte, N. C.
Pittsburgh • Philadelphia**



17 BATTERY PLACE • NEW YORK 4, N. Y.



He just received his cost analysis on

Moropa Jute Brattice Cloth!

You, too, will have reason to jump with joy if you analyze your costs on Moropa Jute Brattice. Priced no higher than ordinary brattice cloths, the exclusive impregnated Moropa remains fire-resistant and slime-repellent far longer . . . pares down operating costs continuously. Operating men prefer Moropa because their records show it stays dry, clean and easy to handle—for reclaiming and rehangng—even after long underground service. Available in all standard widths and weights.

Manufactured and Distributed Only by

John Flocker and Company

644 GRANT STREET • PITTSBURGH 30, PA.

Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope

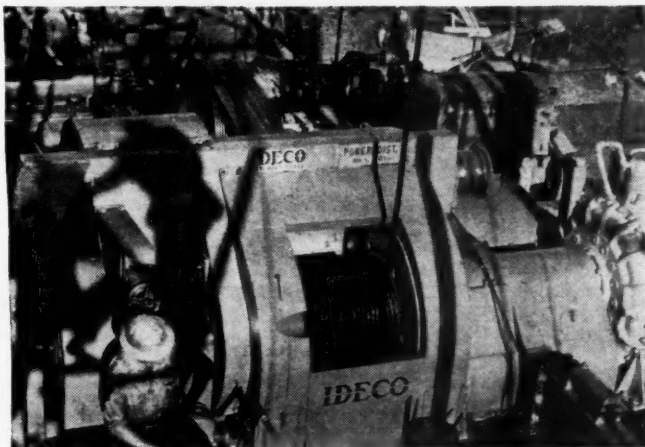
THE CLUTCH THAT STOPPED CLUTCH TROUBLE

Here is the one truly modern clutch for all heavy duty industrial drives.

It controls power and torque through a cushion of air—with as firm a grip or as light a grip as the job requires. It has no springs, arms, levers or toggles—requires no lubrication and little maintenance.

It is the Fawick Airflex Clutch—proved for superior performance and economy—in hundreds of industrial applications and in thousands of Diesel-driven Navy ships.

Let us help you engineer clutch trouble out of your machines. Book on request.



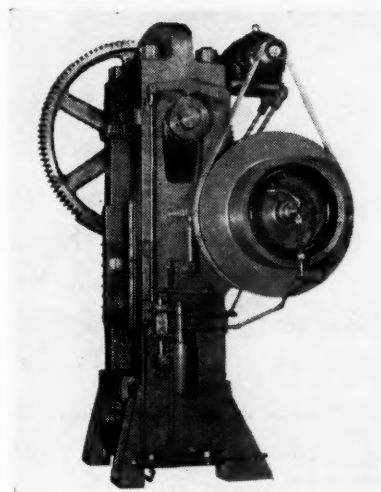
Oil-well drilling rig—equipped with 11 Fawick Clutches.



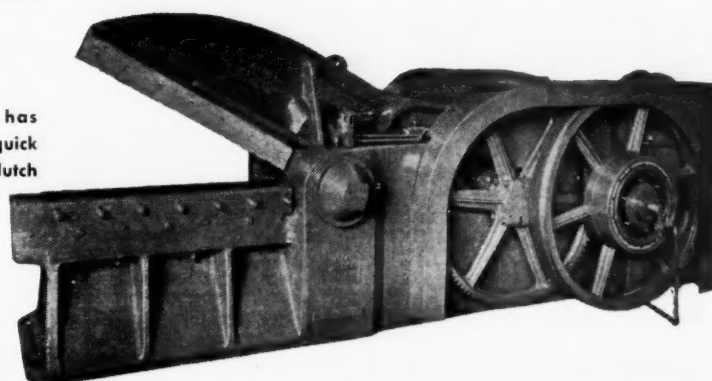
▲ Modern power shovel gives full-time operation through dependable Fawick Clutches.



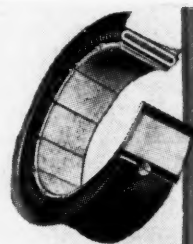
Steel rolling mill Fawick-equipped for smooth, even power.



◀ Heavy duty press has smooth starts and quick stops with Fawick Clutch and Brake.



▶ Alligator shear operates through Fawick Clutch and Brake.



FAWICK *Airflex* CLUTCH

FAWICK AIRFLEX CO., INC. • 9919 Clinton Road, Cleveland 11, Ohio

In Canada, Reynolds-Country Ltd., Montreal, Toronto, Vancouver

In Britain, Crofts Engineers, Ltd., Bradford, England

For safe, sure, efficient lubrication

**have a Gulf Service Engineer
"in the picture" at your mine!**

The proper Gulf Lubricant for this reduction unit, as recommended by this Gulf Lubrication Service Engineer (right), eliminated foaming troubles, and removed an accident hazard.

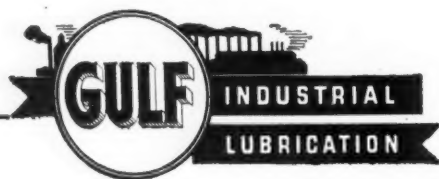


HERE'S real help for you in your drive for greater tonnage and lower costs: The cooperative counsel and practical recommendations of a specialist on Gulf's large staff of Lubrication Service Engineers.

Gulf Service Engineers know how to reduce down time, how to extend periods between overhauls, and how to keep machines up to capacity production by the proper application of the right lubricants.

You get many other benefits, too, when the Gulf Service Engineer is "in the picture" in your mine. He can help you cut maintenance and power costs, improve safety, and lengthen the life of your equipment.

Call in a Gulf Lubrication Service Engineer today and let his knowledge and experience assist you in solving your lubrication and maintenance problems. Write, wire, or phone your nearest Gulf office.



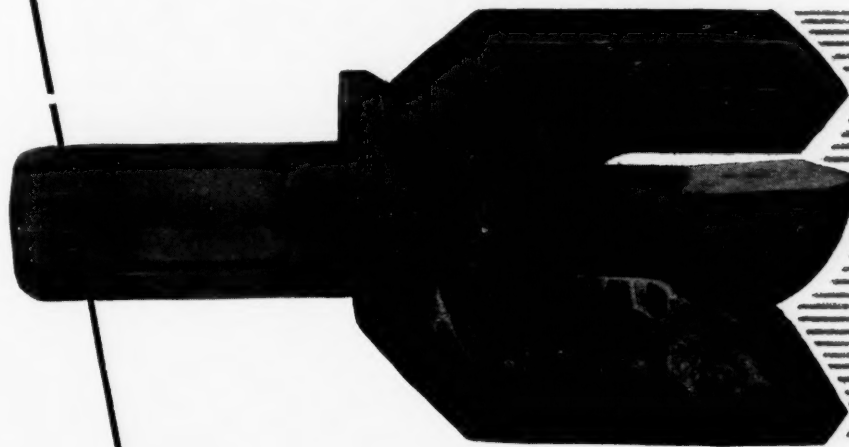
Gulf Oil Corporation • Gulf Refining Company

Division Sales Office:

Boston • New York • Philadelphia • Pittsburgh • Atlanta
New Orleans • Houston • Louisville • Toledo

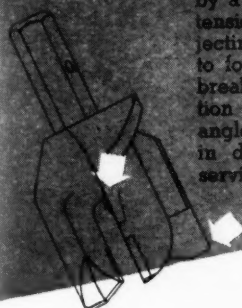
1500 FEET DRILLED

*and its Cutting Edges
are still Keen!*



That's The Record of The
First Kennametal 3-Way Bit.
Today these Modern Drill Heads
Give Even Better Service,
Because They Are . . .

Now improved



by a properly shaped
extension of the shank pro-
jecting between the points
to form an effective core
breaker, and by modifica-
tion of the cutting edge
angles, that has resulted
in distinctively extended
service life.



The Kennametal-tipped 3-Way Drill Bit shown above was the first of its type ever used by a surface mine. After drilling thirty 50-foot holes in typical overburden, its edges were still keen. Thus, the tool material that had previously revolutionized metal-cutting, demonstrated that it was ready to do an outstanding job for America's mining industry.

Today, Kennametal 3-Way Drill Bits are at work at scores of leading surface mines. Typical field experiences are as follows:

- Ohio mine reports: "Have used a Kennametal Bit continuously for one month and it is still cutting faster than any other type bit we ever used."
- Indiana mine says: "First Kennametal Bit used drilled holes needed in removing one-half million cubic yards of overburden, before being resharpened."
- Pennsylvania mine reports: "Kennametal Bit put down 15 holes, 60 feet deep, in 390 minutes, in overburden consisting of hard shale imbedded with limestone nodules. Did not need resharpening."

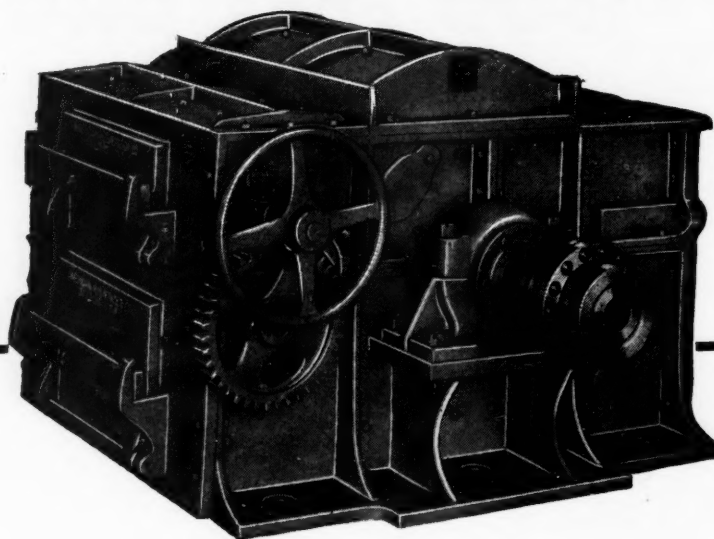
The Kennametal Drill Bit is a sturdy, one-piece heat-treated alloy steel casting, having cutting tips of Kennametal—the tool material that is much harder than the hardest tool steel (75 Rockwell C compared to 66). It is scientifically contoured to maintain gage throughout its long life. The shank is welded-in bar steel, adaptable to fit all common types of augers. *It is the first and only bit that drills holes without taper—and drills more of them faster, cheaper.* Ask us to show you the evidence.



KENNAMETAL Inc., LATROBE, PA.

CONTROL YOUR FINES with AMERICANS

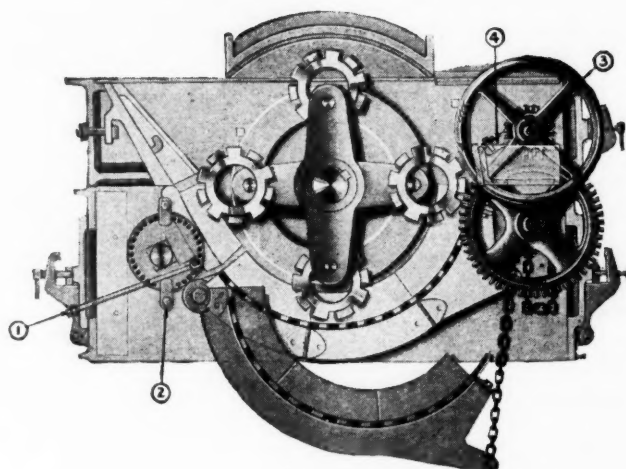
*American's Shredder
Ring Action Assures
Greater Production
of Marketable Sizes*



In reducing coal to stoker sizes in demand, there's no problem of running too high in fines with American Rolling Ring Crushers. Americans hold coal preparation to uniform sizing in stoker runs as well as in lump. Fines are held to a minimum and no oversize is passed.

American's patented shredder ring action splits coal instead of crushing it. Lumps are reduced by cleavage impact rather than by blunt, shattering impact.

Whether your crushing is a one-step operation or a circuit, Americans maintain uniform sizing regardless of the range of reduction.



Cross-section view shows American's patented shredder rings, each with 20 cutting edges, that rapidly reduce coal by splitting action. These manganese shredder rings revolve freely on their shafts and deflect from tramp metal. No shear pins or safety devices to bother with. Metal trap is standard.

Simple, double adjustable feature is emphasized with figures: (1) Set bolt releases (2) Eccentric for breaker plate adjustment (3) Hand wheel raises or lowers cage, locked in position with (4) Position lock pawl.

Send for Coal Crushing Data and Specifications.

American PULVERIZER COMPANY
*Originators and Manufacturers of
Ring Crushers and Pulverizers*

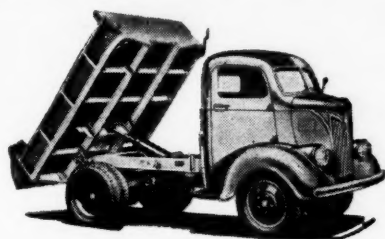
1119 Macklind Avenue
St. Louis 10, Mo.

The BEST COSTS LESS



TRADE MARK

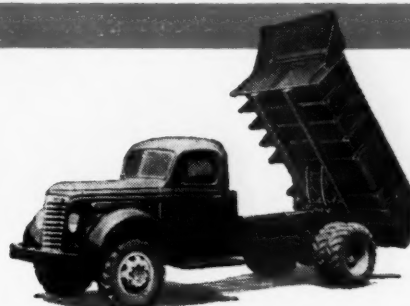
For years Gar Wood has consistently offered truck and trailer equipment of utmost utility and outstanding value. Leadership in this field resulted from this policy. Gar Wood equipment costs less in the long run because it is better built to give peak performance and lasting satisfaction.



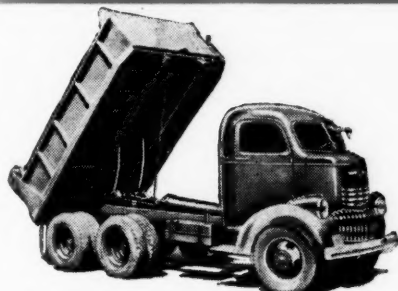
Type C12 Body and Model D6 or D7 Hoist. Dumping angle 55°.



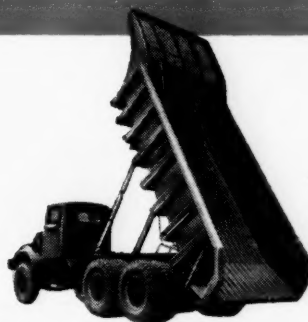
Type X-112 Extra heavy duty Body with automatic downfolding tailgate.



Special rock Body, scoop type rear end. Model F4CA cam and roller Hoist.



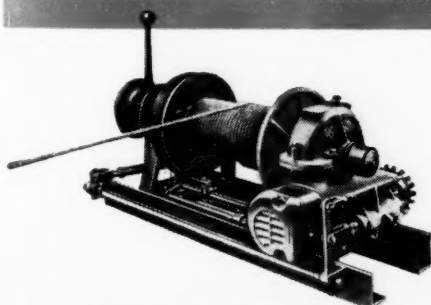
Type W12 Body. Model F4C cam and roller Hoist. Capacity 6 cu. yds.



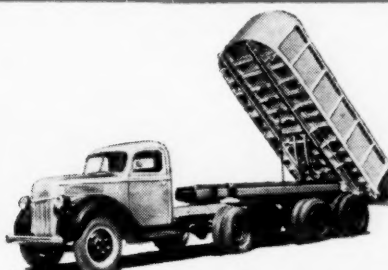
Type X-112 Extra heavy duty Body, scoop end, with Model T-4440 Hoist. Capacity 19 cu. yds.



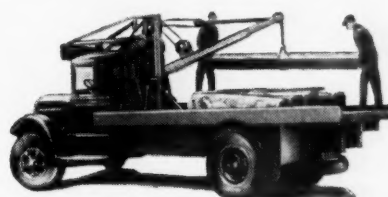
Type W12 Body, front recessed for Model TV83 Hoist. Capacity 15 cu. yds.



Rapid Reverse truck Winch. Single lever control. Capacities 15,000 to 60,000 pounds line pull.



West Coast Special W-12 Body, Model F8C cam and roller Hoist. Capacity 10 cu. yds.



Telescopic boom Crane. Radius 8 to 20 feet.



GAR WOOD INDUSTRIES, INC.

7924 RIOPELLE ST.

DETROIT 11, MICH.

WORLD'S LARGEST MANUFACTURERS OF TRUCK AND TRAILER EQUIPMENT

OTHER PRODUCTS: TRUCK TANKS ROAD MACHINERY HEATING EQUIPMENT MOTOR BOATS

***-only the better managed
mines use this wheel!***

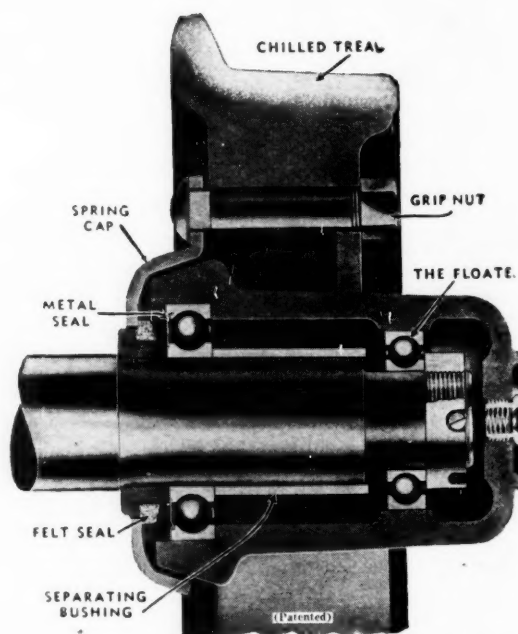


Operators who check operating costs most carefully . . . who check wheel maintenance costs regularly, are our best customers on S-D "Floater" Ball Bearing Wheels. We've found that the better managed mines are always looking for improvements that mean lower costs, and S-D "Floater" wheels cut wheel maintenance costs tremendously.

In many mines, wheels and trucks have been an orphan child, so to speak. And, with so little attention given to their vital importance, they have become costly items—retarding output, wasting grease, labor and power.

If you are not using S-D "Floater" Ball Bearing Wheels, you may, unknowingly, have a big profit leak in your wheels. For, engineers' tests have proved that your locomotives can handle almost 50 per cent more load when the cars are equipped with S-D "Floaters" than when equipped with wheels having other types of precision bearings. Furthermore, your cost of greasing will be held to that of one greasing in 5 years, and wheel castings and bearings are guaranteed for 5 years against breakage, excessive wear or failure.

Don't wait any longer to check your wheels. They may be costing you plenty.



You can test S-D "Floaters" for yourself on our FREE TRIAL PLAN. Write to us now.

Sanford-Day Iron Works, Knoxville 9, Tennessee



Nothing can take the place of unremitting care

The care exercised in every detail of the manufacture of AMERICAN Explosives and blasting caps is reflected in their efficient and economical performance on all types of blasting. Intensive research, chemical control and thorough inspections add still further to your assurance of satisfactory results, whatever your blasting requirements.

• Capable field engineers are available at your call.



- ★ HIGH EXPLOSIVES
- ★ PERMISSIBLES
- ★ BLASTING
POWDER
- ★ BLASTING
ACCESSORIES

American Cyanamid & Chemical Corporation



A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

EXPLOSIVES DEPARTMENT

SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill.
Pottsville, Pa. Hazleton, Pa. Maynard, Mass.



Check

**YOUR JOY PARTS..
REPLACE STOCK
NOW!**

**FOR
WANT OF REPLACEMENTS
YOUR TONNAGE
CAN FALL**

**Insist on
genuine JOY parts
for JOY mining
equipment**

*Perfect Fitting
Longer Wearing*

**Forged
ALLOY STEEL
GEARS**



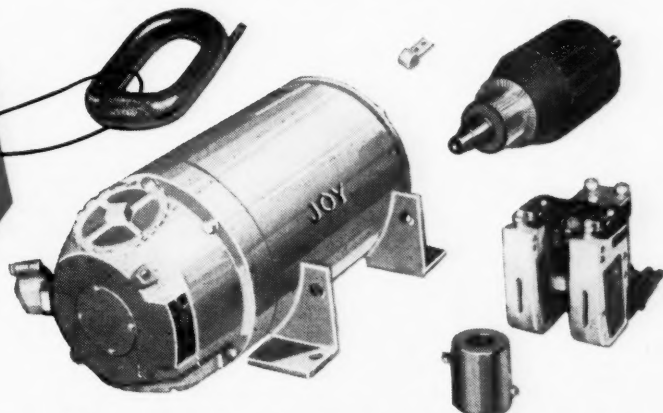
Certain to give longer service because they're made of the correct analysis steel for heaviest work . . . Joy's forging process gives greater inherent strength.

**Sturdy
Heavy Duty
CHAINS AND
FLIGHTS**



Joy loader chains and flights carry the heaviest loads smoothly and safely for they are ruggedly constructed. Their balanced design, when used together, enables them to move extra-heavy loads at high tonnages per minute.

**Dependable
MOTOR AND
CONTROL PARTS**



Motors are the heart of mechanized mining and Joy electrical equipment is especially constructed for heavy duty work. Voltage, amperage, rpm and gearing is all carefully worked out for maximum performance. Only genuine Joy replacements will bring equipment performance up to the proper standards.

*Joy Engineering
Services are at your call*

**It's a Genuine JOY Part
if it has this name**



JOY

Manufacturing Co., Pittsburgh, Pa.

GENERAL OFFICES: HENRY W. OLIVER BUILDING

COAL STRIPPERS CUT COSTS WITH PRIMACORD UNCOVER ECONOMIES AS WELL AS COAL

...and these are some of the reasons

FIRST, consider the fact that stray currents need not be a hazard when you detonate with PRIMACORD because the cap is never attached until just before the blast. Caps *never* go into a hole.

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JUNE, 1946

Ivan A. Given, EDITOR

Next Step?

THE TERMS of the government contract signed on May 29 left Lewis happy and many operators deeply dismayed—and with good reason. For one thing, a reading of the contract leaves the distinct impression that somebody was planning for a long period of government operation—perhaps Lewis, perhaps the government, perhaps both. For another, photographs of the hilarity after the signing reveal no trace of an operator—or of the guy who will have to pay the bill.

The contract was generally assessed as a victory for Lewis—as it was. He was rewarded for putting the screws on, with federal officials apparently preferring to forget the effect on the public's pocketbook and the money and brain sweat poured out over the years by management to render a better service to the consumer and protect the industry's competitive position. But since federal officials do not have to consider the consumer's reaction to higher costs and the effects of his embracing competitive fuels, it is not surprising that they prefer to placate labor leaders. They run true to form, therefore, when they make a contract providing "discipline" for management with no word of union responsibility, raise the cost to the consumer arbitrarily, put management at the mercy of an arrogant union head and give Lewis *carte blanche* to tie up any mine any time without penalty. That is the only conclusion to be drawn from the safety and penalty clauses, in addition to the fact that the agreement is so loosely phrased as to permit throwing an elephant through it—a fact Lewis may be expected to take full advantage of.

The country and the coal industry have suffered heavily for misuse of the power exercised by union leaders with the help and backing of the federal government. Even at this writing, federal officials seemed to be relying more on seizure and appeasement, thereby penalizing the innocent for the actions of the guilty, rather than getting at the roots of the difficulty—the Wagner Act and collateral legislation, administrative partiality and Supreme Court decisions in favor of unioners. The Truman proposal of May 25, in fact, offered nothing to remove the fundamental causes of abuse of union power. That remained for Congress, and particularly the Senate, which at last seemed in a mood to legislate on the side of making collective bargaining a two-way street, curbing unrestricted use of union power, making unioners responsible for living up to contracts and putting public interest ahead of that of union leaders. While legislation still had the veto hurdle ahead, there was reason to believe that

the ball had been started rolling in the direction of eventual if not immediate relief.

Coal, to repeat, would welcome such relief wholeheartedly. But if it is to derive the maximum benefits from such relief, it must do a job itself. That job is taking the offensive in setting standards for operation, safety and relations with employees and lending its assistance to getting them put into effect to the maximum extent possible. This is not to infer that coal has not made major progress in all these categories but rather that industry action can speed up future progress and thus eliminate friction, promote employer-employee cooperation, build public good will and lay the groundwork for eventual elimination of the annual calamity that has featured coal mining in late years. An industry-wide conference to develop a code and set up a permanent organization to translate advances in thinking into reality seems a logical first step. It should pave the way to higher efficiency, industry tranquility and public favor—all steps to greater progress for both management and miner.

More—Not Less

ONE of the less reassuring byproducts of the 1946 Lewis campaign against the coal industry is the criticism popping up against the industry's public-relations program. Some of it is based, it appears, on nothing more than the fact that headquarters are in New York rather than in some other city dearer to the hearts of those raising their voices. This is not to say that criticism should be outlawed. However, there is this about it: criticism backed up by contributions for the support of the industry's program or by individual efforts to promote coal's interests is much more likely to serve the industry's purpose—improvement of coal's standing with the public.

In contrast to previous years, there has been a real improvement in public attitude toward the coal industry despite the greater inconvenience to which the public has been put by the Lewis pogrom. There is every reason to believe that this improved public attitude reflects the operations of the Bituminous Coal Institute and its opposite number in the Anthracite Industries organization, plus local and individual efforts. Since results already are being obtained and since a sympathetic public opinion is a priceless asset, the time is ripe for an enlarged and expanded program. Backed up by more individual action and supplemented by work directed toward better employee relations, public-relations work will yield even greater dividends in the future.

1946 COAL CRISIS:

How It Originated

What It Means to the Nation

What Must Be Done to Prevent a Recurrence

*"All power corrupts;
Absolute power corrupts absolutely."*

LORD ACTON'S pithy summary of the effects of power received new substantiation in the tactics followed by John L. Lewis in the 1946 contract "negotiations," not to mention the activities of Messrs. Whitney and Johnston in the railroad field. Using in full their federal hunting licenses, these "labor leaders" deliberately set out to win their demands regardless of the cost to the country. Lewis accordingly chose not to "bargain collectively" but to present a set of demands on a "take-it" basis and back them up by a strike to strangle the national economy and bring the country, the government and, incidentally, the coal industry, to his terms.

Lewis' approach to the negotiations was, in short, nothing more nor less than a calculated grab for additional power. His role was marked by a new low in intemperate vilification and contemptuous and arrogant disregard of the operators' proposals—proposals that would have led quickly to a new contract if that had been his primary aim. That contemptuous and arrogant disregard of contrary opinion and industry and public interest was exhibited in even finer flower in his deliberate decision to call a strike and maintain it to the point of endangering not only employment and commerce but health and well-being as well.

As in other recent negotiations, the operators functioned under the difficulties that might be expected in the position they found themselves—that of a

man with a pistol pointed at his head while the cop who should have been seeing that there was at least fair play was helping his adversary—by inaction if not actively. In other words, federal officials either confessed their inability to check or turn Lewis or lent him such aid as was within their power. The result was again seizure and negotiation of a contract by the government—a face-saving device penalizing the operators for Lewis' failure to bargain while federal officials sought ways and means of giving him at least part of the things the operators in good conscience could not agree to. Meanwhile, while miners and other workers lost wages and the public suffered, Lewis turned the strike screw to its ultimate limit.

Labor's Power Unlimited

The 1946 coal negotiations and other labor developments, in fact, dragged out into the open two things most federal authorities have valiantly tried to conceal:

1. That labor leaders hold unlimited power as a result of deliberate federal favoritism—a situation altered in no way by President Truman's intervention in the rail strike and his request for emergency legislation strengthening his power to seize and assess penalties but making no mention of a revision of the laws that are the root of the difficulty.

2. That labor leaders, despite an intensive campaign to make the people accept the contrary, are no more likely to use their power in the public interest than any other despots.

To quote Shakespeare, "Upon what meat doth this our Caesar feed, that he has grown so great?" The main course is the Wagner-Connery National Labor Relations Act, commonly known as the Wagner Act. Side dishes and dessert are administrative rulings and decisions of the Supreme Court—all building up the power of labor leaders and extending their authority over the economic life of the Nation. Among other things, the Wagner Act says:

"Sec. 1—The denial by employers of the right of employees to organize and the refusal by employers to accept the procedure of collective bargaining lead to strikes and other forms of industrial strife and unrest, which have the intent or the necessary effect of burdening or obstructing commerce by (a) impairing the efficiency, safety or operation of the instrumentalities of commerce; (b) occurring in the current of commerce; (c) materially affecting, restraining or controlling the flow of raw materials or manufactured or processed goods from or into the channels of commerce or the price of such materials or goods in commerce; or (d) causing diminution of employment and wages in such volume as substantially to impair or disrupt the market for goods flowing from or into the channels of commerce.

"The inequality of bargaining power between employees who do not possess full freedom of association or actual liberty of contract and employers who are organized in the corporate or other forms of ownership association substantially burdens and affects the flow of commerce and tends to aggravate re-

POWER AND ITS REFLECTION

John L. Lewis glares out over evidence of his power — coal cars made idle to choke his demands out of the Nation

Press Association, Inc.



QUESTIONS FOR CONGRESS—

And How It Has Answered

1. Should not federal statutes include a declaration that government policy requires union leaders to bargain in good faith and make every effort to reach agreements before calling and maintaining strikes? *Case bill, House, Feb. 7; Senate, May 25; House, May 29.*

2. Does the "right to strike" take precedence over all other rights of the citizen?

3. Must the right of the citizen to work when and where he chooses at wages satisfactory to himself be subordinated to the "rights" of union leaders?

4. Does the "right" of a union leader to force a man into his organization take precedence over the right of an individual to join or not as he chooses?

5. Do the "rights" of union leaders take precedence over the rights of union members to a voice in the affairs of their organization?

6. Does the "right" of union leaders to employ coercion and violence, including barricading of plants, picketing of homes and other violations of civil liberties, take precedence over the right of the citizen to go peacefully about his lawful business? *Case bill, House, Feb. 7.*

7. Are not employers, who also are citizens, entitled to free speech?

8. Is the "right" of union leaders to organize and maintain boycotts and thus ruin an employer's business consonant with the freedoms guaranteed the citizen under the Constitution? *Case bill, House, Feb. 7; Senate, May 25; House, May 29.*

9. Are not employers entitled to equal standing before government boards and agencies?

10. Should union leaders be exempt from responsibility for carrying out contracts? *Case bill, House, May 7; Senate, May 25; House, May 29.*

11. Should not the scope of "collective bargaining" be limited to matters of wages, hours and working conditions?

12. Is union-leader invasion of the field of management calculated to promote efficient production and best possible service to the public? *Case bill, House, Feb. 7; Senate, May 25; House, May 29.*

13. Is union-leader exemption from laws forbidding racketeering, extortion and actions in restraint of trade in the best interests of the country? *Case bill, Senate, May 25; House, May 29.*

14. Should employers and the public be penalized by strikes resulting from warfare between unions or called for political purposes?

15. Should labor leaders be exempt from the laws governing slander and libel?

current business depressions by depressing wage rates and purchasing power of wage earners in industry and by preventing the stabilization of competitive wage rates and working conditions within and between industries.

"Experience has proved that protection by law of the right of employees to organize and bargain collectively safeguards commerce from injury, impair-

ment or interruption and promotes the flow of commerce by removing certain recognized sources of industrial strife and unrest, by encouraging practices fundamental to the friendly adjustment of disputes arising out of differences as to wages, hours or other working conditions and by restoring equality of bargaining power between employers and employees.

"It is hereby declared to be the policy of the United States to eliminate the causes of certain substantial obstructions to the free flow of commerce and to mitigate and eliminate these obstructions when they have occurred by encouraging the practice and procedure of collective bargaining and by protecting the exercise by workers of full freedom of association, self organization and designation of representatives of their own choosing for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection."

Achieved by the Wagner Act?

Passed in 1935 after the "Blue Eagle" was shot down by the Supreme Court—then of a vastly different complexion—the Wagner Act was the keystone in the New Deal program of winning support for itself as a "do-all" government exercising its power in every business and personal activity of the citizen. Its announced objectives, it will be recalled, included elimination of burdens on or obstructions to commerce, "the stabilization of competitive wage rates and working conditions" and encouragement of "practices fundamental to the friendly adjustment of industrial disputes."

Have all these things come about? Does closing the coal industry and the railroads look like elimination of burdens on or obstruction to commerce? Does the scramble of rival labor leaders to get more than the other fellow look like stabilization of competitive wage rates and working conditions? Does Lewis' approach to contract negotiations look like a "friendly adjustment" of differences? In short, has the Wagner Act done anything to reduce industrial disputes and burdens on commerce, including interruptions of production and higher costs to the consumer? A realistic examination of the results proves that the only thing it has done, along with Supreme Court decisions and administrative rulings, is to make the labor leader monarch of all he surveys—at least to date.

Just what is possible under the Wagner Act and its collateral administrative rulings and court decisions? Any man can set up a "labor union" whenever and wherever he chooses. He can pick out any mine or plant he wants, whether it already has a union agreement or not, and, if he can get a few employees to sign up, although even that is not always necessary, he is at liberty to use his own methods in trying to get the management to meet with him. If he doesn't get anywhere, including a decision against him in proceedings to determine the bargaining agent, he can



BIG GESTURE— SMALL RESULTS

Because Lewis' writ did not run to this particular property, it had a chance to operate after the seizure—with soldier protection. But seizure was a futile gesture with this and a few other exceptions—again demonstrating the extent of union-leader power and the failure of the federal labor policy from which such power is derived.

Press Association, Inc.

picket the plant, barricade its entrances, shut it down and keep it down, using any force or violence he chooses, and still be in violation of no federal statute. Or, if he has control of another union

or unions or can make a deal with them, he can shut the plant down by refusing to permit its product to be moved, used or installed, still in violation of no federal statute.

Legislation the Answer

The preceding has been presented as still the situation, which it was at the time this was written, despite the Truman intervention, his request for emergency powers and Senate action in passing the Case bill after restoring provisions cut out of it by the Education and Labor Committee. While the willingness of the Senate to come to grips with the problem via the Case bill was a hopeful sign there was still no assurance that a major change in federal policy was in immediate prospect. Veto, for example, was a decided possibility.

Assuming no immediate change in the federal picture, some pertinent questions on the labor situation are:

1. What does it mean to the coal-mining industry?
2. What does it mean to industry in general and—more important—to the public?
3. What should be done?

What continuation of present federal policy and partiality means to the country, as well as the coal industry, is easily determined by looking at the history of coal, railroad and other labor-leader actions. It means continued interruptions of production, raids on the consumer's pocketbook and warfare between rival unions.

What should be done? That question

has been the subject of millions of words of debate since the New Deal came into power but the answer can be stated very simply—an overhauling of federal labor policy for the protection of the public. "How" is a bit more difficult. Outright prohibition of strikes in connection with the negotiation of wage agreements is an extremely remote possibility—and has the real disadvantage that if adopted it inevitably would have compulsory arbitration as its handmaiden. Thus, the cure might be worse than the disease. "Cooling-off" periods, "fact finding," seizure and other palliatives, experience has proved, also are of little or no use.

Students of the problem generally agree that a statutory declaration to the effect that it is government policy that union leaders must really make an attempt to reach an agreement before resorting to strikes might be a salutary step. The mere incorporation of such a policy in the body of federal law would serve notice on labor leaders that the strike was a weapon to be used with caution and would operate to make more effective mediation, conciliation and other steps leading to the breaking of deadlocks. At present, union leaders are entirely free of such an obligation.

The coal industry, since it deals for

the most part with one union and that union is unchallenged at the moment, is not directly subject to some of the difficulties experienced by other employers. However, it could and may be. Lewis has demanded use of nothing but union-made materials and equipment and also the right to strike the mines to support strikes in other industries. If those demands were granted, coal also would be involved in the secondary boycotts that plague other industries and both management and miners would lose as a result of being used as cat's paws in organizing other industries.

In a broader sense, labor-leader tactics in other industries also concern coal because they hamper business activity and consequently reduce fuel requirements, in addition to forcing up the cost of equipment and materials and making them more difficult to obtain.

Coal likewise is not so directly involved—at least so far—in picketing and blockading, although there have been incidents in the past and fresher and more numerous actions directed toward closing down the few non-union or rival-union mines during the April-May strike. In fact, some union members went even farther and attempted—often successfully—to keep mines from reopening during the truce period. As is customary in these days of operation under the Wagner Act, these pickets have not hesitated to use threats and violence—"or else" being the standard ultimatum to management and working employees.

Picketing is perhaps one of the biggest—if not the biggest—factors in the picture of union power. At the moment, picketing is conducted as if no manager or employee not a member of the union had any rights whatever. Pickets, under

the personal direction of union leaders, have arrogated to themselves the "right" to suspend completely the normal civil liberties of the citizen. As long as men who refuse to work can prevent management from functioning and keep other men who want to work off the job, that long will misuse of power by labor leaders continue.

Other manifestations of union power include slander, libel, denial of the right of free speech to either employers or union members, refusal to accept responsibility for living up to contracts, invasion of the field of management and other anti-social activities.

The key to the situation, as previously intimated, is Congress. Congress should enact a comprehensive, well-rounded program and, if it is vetoed, pass it over the veto. Unless Congress does a real job, the showdown on union-leader power will be merely postponed and meantime both industry and the public, not to mention rank-and-file union members, will continue to suffer. Congress has made an attempt in some directions. Coal men along with other citizens should and must intensify their efforts to support the legislators and give them the facts on which they must work.

Coal's Job-Positive Action

Along with intensification of work with Congress, the coal industry has another and more direct problem. The government-sponsored contract inevitably poses new difficulties growing out of new situations created by that contract, including the added competitive problems the extra costs involved in the contract entail. Along with these new questions, coal has the old one of getting off the defensive and taking positive action to prevent a recurrence of the annual calamity to which it has been subjected in late years.

It seems clear that Lewis has been advantaged and his government supporters encouraged by the fact that coal can point to no industry-wide policy covering the points on which the industry normally is attacked. Not having a policy to look to and confused by the propaganda of Lewis and his supporters, the public is inclined to keep its counsel or shrug off the question with "perhaps they're right—I wouldn't know."

Industry Policy Needed

It seems clear that coal will have to readjust its operations to meet federally imposed conditions and that it should have its own program and its own organization for speeding the adoption of desirable developments in operation, safety and relations with employees. It has made progress—great progress—but it is unable to point to a concrete industry policy and organization making evident that the industry is alive to its responsibilities and is carrying them out.

It is logical, therefore, that coal should call an industry-wide meeting for these and other purposes:

1. Adjustment of its operations to the new government-imposed conditions.
2. Adoption of a code of standards

putting into concrete form its progressive policies for the improvement of mining operations, safety and employee relations.

3. Setting up an organization to make revisions in the code as necessary and to promote their speedy adoption.

With its own program and its own organization for putting it into effect, coal should be able to get off the defensive spot and facilitate the better relations with employees and the public that are necessary for future tranquility and prosperity.

The Public Must Be Told

It will be noted that the major objectives are improved relations with the public and with employees, along with more efficient and safer operation. Public-relations work must rank high in industry proceedings to make sure that the advantages of the work already done are not lost and to gain the benefits that intensification will bring. The effects of past work were plainly visible in the 1946 contract negotiations. Compared to other years, there was an appreciable decrease in public reaction against coal mining and consequently a corresponding decrease in written and spoken attacks based on misinformation, lack of information and unfairness.

This is not to indicate that some of the old reliables—and a few new recruits—are not still active. Mrs. Roosevelt, for example, in her column May 9, said: "The basic wage of the coal miner is still low and the working conditions are still deplorable."

Over the signature of the editor, *Coal Age* wrote her as follows May 10:

"In your column appearing in the *World-Telegram* of May 9, you make two statements about the coal-mining

industry that I want to comment on.

"First, I would like to refer to your statement about the coal industry being in 'a bad way.' May I invite your attention to the industry's war record. It was the only major industry in the United States that increased output steadily with fewer and fewer men, in spite of strikes and other difficulties, until the drain finally resulted in a slight recession in 1945. In contrast, I offer you Great Britain, where the coal industry signally failed to meet requirements—largely due to government heckling. The United States coal industry met its obligations in full because the operators, for years before the war, invested their money and brain sweat in improvements leading to higher efficiency and greater safety—and worked to enlist the sympathetic cooperation of their employees. Does this record warrant the statement that the coal industry is in 'a bad way'?"

"Second, I would like to offer something on your statement that 'the basic wage of the coal miner is still low and the working conditions are still deplorable.' The basic wage scale in the coal mining industry is \$1 an hour. Few get less, as scrutiny of the contracts will quickly prove. In December, 1945, according to the Bureau of Labor Statistics, the average earnings of the bituminous miner were \$1.28 an hour and \$58.20 a week. In that same month, the average earnings of the anthracite miner were \$1.385 an hour and \$54.73 a week. In only four out of 144 industries, according to the Bureau of Labor Statistics, were hourly earnings higher in December than in coal mining. In only one were weekly earnings higher. Does this support the conclusion that miners' wages are 'low'?"

"You also describe coal-mine working conditions as 'deplorable.' Perhaps you have polled the half million men who work in coal mines and, therefore, are in position to speak with authority on this. However, as you might guess, I have worked in and been around many coal mines and I doubt that few, if any, coal miners look on their working conditions as 'deplorable.'"

It took another feminine writer, however, to reach a new low in unfairness—Mrs. Agnes E. Meyer, wife of the publisher of the *Washington (D. C.) Post*. Under date of May 7, Mrs. Meyer had such things as the following to say:

"I have just been through the bituminous coal areas of the Appalachian Mountains, where the fatalities read like battle reports from Iwo Jima. . . .

"Why does the Nation countenance such wholesale slaughter in one of its most essential industries? . . .

"Before I describe the horrors, the injustices and the terrorism I have

witnessed . . . The hell in which I spent last week," etc., etc.

The Coal Age letter to Mrs. Meyer read as follows:

"I was profoundly disturbed—indeed shocked—in reading your dispatch of May 7 to note your forthright and unequivocal condemnation of a vital segment of the bituminous industry—and, by not-so-veiled implication, the entire industry. I know that it is fashionable to attack coal mining for its alleged shortcomings, but I contend also that if the entire industry is to be pilloried because a few—and that means a few, not an entire region like the Kentucky-Tennessee area—have failed to match the progress of the rest, it is just as logical to condemn the newspaper industry out of hand because of the derelictions of a few shabbier publishers.

"If I may take that liberty, I would like to express the opinion that the whole approach of your dispatch was essentially unfair. Take the figures on deaths in coal mining, for instance. I am the first to say that there is room for improvement in the industry's injury record. That is one of the major planks in the Coal Age editorial platform—and an overriding goal of the vast majority of the operators. But when you publish an average of 1,889 as the annual deaths in anthracite and bituminous mining, it leaves an impression totally different from the fact that total deaths in 1945 for both industries was only 1,086 (preliminary estimate of the U. S. Bureau of Mines), against 1,306 in 1944, as well as the fact that the average number of deaths per million tons was 1.72 in 1945 against, for example, 3.80 in 1918. I believe it would be only fair if these facts were brought out because, even if it is not as fast as the industry desires, progress is being made.

"Without attempting to discuss them in detail, I also contend that your other conclusions are equally unfair. I assume that your objective was hastening improvement of conditions where necessary but I feel that in your approach to the question you actually have rendered a disservice by making it more difficult for progressive operators—by far the vast majority—to carry out the continuous improvement programs they long ago embarked on.

"I hope you will see fit to correct some of the false impressions your dispatch leaves and I urge you to do so."

While, as stated, these and other examples of misinformation, lack of information and unfairness were less noticeable in the 1946 coal crisis, the fact that they continue, even in lesser volume, is evidence that coal cannot relax its public-relations and public-information work. It should make it a

NEXT STEP FOR COAL?

SITUATION:

Government-imposed contract sets up new conditions and poses new problems coal must meet.

Coal has made major progress in improving its operations but events have proved it suffers because it lacks a formal code of standards governing operation, safety, relations with employees and related matters, as well as a formal organization for speeding acceptance and making revisions as necessary.

The public, lacking a formal code and an organization for putting it into effect, is correspondingly slower to accept evidence of the industry's accomplishments, thus playing into the hands of Lewis and his government supporters.

LOGICAL STEP:

Holding of an industry-wide conference to:

1. Reorient industry operations with the new conditions imposed by the government.
2. Develop a code of standards putting into concrete form its progressive policies for improvement of mining operations, safety and employee relations.
3. Set up an organization to make revisions as necessary and to promote speedy adoption of industry-approved policies.

point to refute misleading or unfair statements by letter to the author or otherwise, giving the true facts. In fact, coal men should anticipate unfavorable comment by personal appearance in the press, on the radio and at public meetings in their region or locality.

The record shows that coal mining is a progressive industry that recognizes its responsibilities to its employees and the community. Its investment in new equipment and in more efficient and safer methods while it was losing money in past years enabled it to fuel the war effort in full, pay steadily higher wages and still keep the cost of coal down to at least \$1 a ton less than it otherwise would be at the present time. The facts to refute mistaken and unfair attacks are available. By making full use of them, coal men, individually and collectively, can render a real service to the industry and the public.

Miners Should Know the Facts

Public relations needs, however, must be paralleled by another and equally vital job—improving relations with employees. Too few miners know the facts about the industry and their part in it. If they knew and were convinced that by their cooperation they could promote progress, there is good reason to believe that their opinion would have weight and would, in conjunction with some change in the legislative picture, relieve the industry and the public of at least part of the unwise strikes and increases

in costs growing out of excessive wage and other demands. Some companies have done an excellent job of making the miner a responsible partner in production, distribution and utilization—and, more important, making him aware of that fact—but the ground so far has been cultivated only partly.

A Return to Labor Sanity

Miners who know their part in industry progress and who are convinced that they are partners with management are, among other things, more efficient miners. This, experience has proved, is true. If there were enough of them, it also is a fair conclusion that some of the difficulties the industry is suffering would disappear almost automatically.

The 1946 coal crisis, if nothing else, demonstrated once and for all that (a) labor leaders have too much power and (b) that they cannot be depended upon not to misuse it. Thus, while it set the coal industry, the public and a return to full peacetime production back substantially, it accomplished one thing—it showed clearly the need for action and set in motion forces that eventually should result in fairness in relations between employer and employee. By intensifying, around an industry code and organization or otherwise, its work with its employees, with the public and with Congress, the coal industry can hasten a return to sanity and insure that progress is based on a firm foundation of management-miner cooperation.

METAL-CLAD SWITCHGEAR

Handles Interrupting Needs at Coaldale

Battery Used to Close and Trip the 11,000- and 2,300-Volt Breakers — Ground-Detector Installations Protect High-Voltage Lines — Two-Stage Compressor and Aftercooler Supply Dryer Air to Colliery

By W. E. Connor
Assistant Mechanical Superintendent
Lehigh Navigation Coal Co.

And R. R. Richart
Assistant Editor, Coal Age

METAL-CLAD switchgear on both the 11,000- and 2,300-volt 25-cycle circuits meets the higher interrupting requirements at the new Coaldale substation of the Lehigh Navigation Coal Co., Coaldale, Pa. The station, located near the Coaldale breaker, is the most modern of all the installations serving the company's collieries in the Panther Valley section of the southern anthracite field. A fire, caused by the explosion of an obsolete-type oil circuit breaker with insufficient interrupting capacity, destroyed the old station when work was well under way to modernize it. A 125-volt station battery furnishes control power for the operation of all switchgear units—both closing and tripping. A modern air compressor furnishes dryer air to the underground load because of an aftercooler, the first installation of its kind in this field.

Fire in May, 1943, destroyed the original No. 8 Coaldale substation and

the following equipment inside the building: two 500-kw. 275-volt rotary converters and their 11,000/196-volt transformers and switching equipment; four 11,000-volt oil circuit breakers; six 2,300-volt oil circuit breakers (two of which were new but not in service); six d.c. circuit breakers, small starters, etc. Fortunately, a three-unit 5,000-kva. 11,500/2,300-volt bank of power transformers 8 ft. from the building was not affected. Half an hour after the fire had been extinguished this bank was temporarily connected to furnish power to the underground pumping stations. Afterwards, a temporary switching and rotary converter station was set up so that the colliery lost only one day's work.

In planning the new substation, consideration was given to locating it close to the center of the load. It could not interfere with the existing buildings and it had to be located over a shaft pillar because of possible caving or slippage of the ground. All equipment for a given voltage, such as breakers, disconnects and lightning arresters, had to be interchangeable. Provision had to be made for extending both ends of the 11,000-volt switchgear at some future time.

Ease in transferring the load from the temporary substation to the new one was important. Although the colliery operates six days a week it still cannot do without power all day Sunday. Because of the underground pumping demands, a six-hour pump stoppage is all the operation can tolerate. Over that, the sumps must be emptied and the stage set for a planned stoppage.

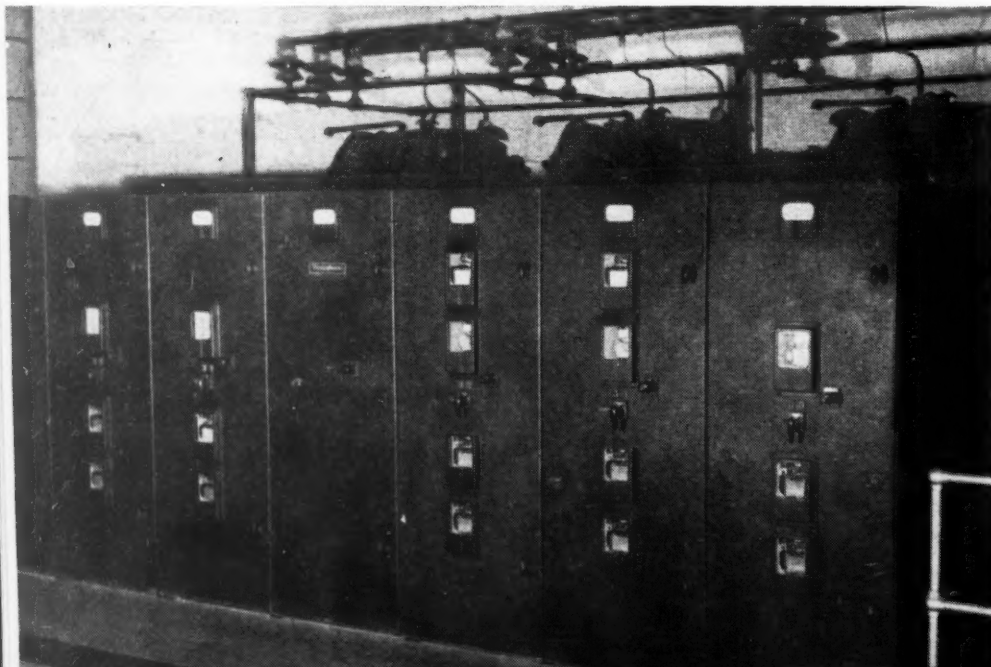
The new building, a 48x80-ft. one-story concrete-block fireproof structure with a corrugated asbestos hip roof (with ventilators), was completed in the summer of 1945. The exterior of the walls was waterproofed to prevent the driving rains from forcing water through the concrete blocks.

All the electrical equipment was installed and in operation by Dec. 1. After the new compressor equipment was installed, six weeks later, the station was complete. The arrangement of the equipment reflects hours of planning. The building is roomy and when it becomes necessary to service any of the equipment there is ample room for doing it.

Like station facilities are placed in isolated groups. The 11,000-volt metal-clad switchgear and the 11,000-volt (indoor-type) rotary-converter transformers are in the north end of the station. Along the east wall is the 2,300-volt metal-clad structure and opposite it, on the west side of the station, is the 275-volt d.c. switchboard. Two air compressors occupy the south end of the station, while two rotary converter sets have the center.

Last November, three weekends were used to shift the colliery's electrical load from the temporary substation to the new one. On Sunday, Nov. 11, two half-hour interruptions were necessary to energize the new 11,000-volt bus. The following Saturday, at the end of the shift, service was interrupted for 30 minutes—long enough to disconnect one unit of the 5,000 kva. 11,500/2,300-volt transformer bank and leave the other two carrying the off-peak load in an open-delta connection (reducing the bank's capacity to 58 percent of its

Each of the six circuit breakers in the metal-clad structure has five times the interrupting capacity of the 11,000-volt units that were destroyed by the fire.





North elevation, or 11,000-volt side, of the new substation.

original capacity). The transformer was moved to the new station, a distance of 700 or 800 ft. The next day another transformer was moved and connected in open delta with the first and the 2,300-volt circuits changed, all in a five-hour period. Finally, the third transformer was moved and connected with only one other half-hour interruption. One week later, the 500-kw. Westing-

gear, the six interchangeable 600-amp. 15,000-volt Type B-20-B Westinghouse De-ion-grid oil circuit breakers have an interrupting rating of 150,000 kva. compared to only 32,000 kva. for the ones destroyed in the fire. Since the substation is within a mile of the Pennsylvania Power & Light Co.'s 52,500-kva. (installed generator and frequency changer capacity) 25-cycle Hauto power

Fig. 1—A network of 11,000-volt transmission lines serves the collieries of the Lehigh Navigation Coal Co. in Panther Valley.

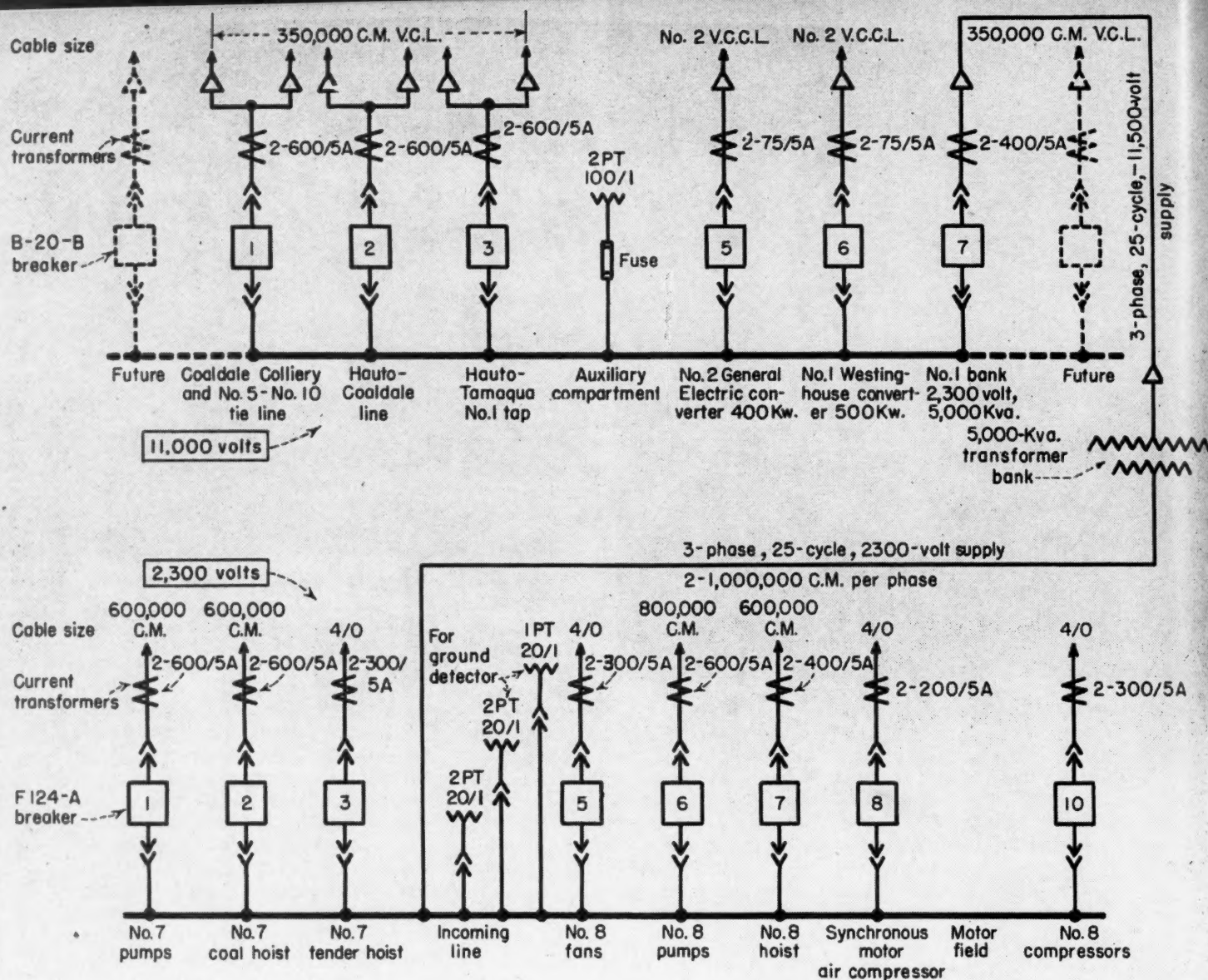


Fig. 2—This single-line diagram shows how the 11,000- and 2,300-volt metal-clad switchgear is arranged.

plant there is plenty of capacity to feed a short that might have to be handled by the substation, hence the need for breakers with an ample interrupting rating.

The switchgear is of vertical-lift metal-clad construction and each circuit breaker is equipped with primary and secondary disconnecting contacts. A circuit can be de-energized by tripping the breaker. Then if, for safety reasons, an air gap is desired, the breaker can be lowered and the circuit has the added protection that disconnecting switches would afford it. Any time the breaker needs to be serviced it can be lowered onto the handling carriage and wheeled to an inspection rack. Here, the unit can be tested, closed and tripped electrically the same as it would be operated if connected to the bus.

Each breaker cubicle is 28 in. wide, 70 in. deep and 74 in. high. The incoming- and tie-line breakers are served by the two three-conductor 350,000-cir. mil VCL cables connected in paral-

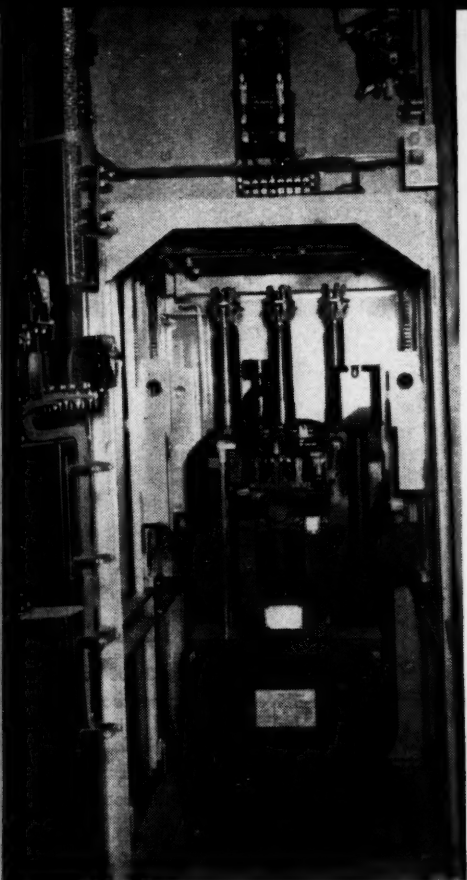
Personnel

J. B. Warriner.....	President
Evan Evans.....	Vice-President in Charge of Operations
R. E. Hobart.....	Mechanical Superintendent
W. E. Connor.....	Assistant Mechanical Superintendent
H. E. Arner.....	Electrical Engineer
C. D. Rubert.....	Preparation Superintendent
W. Julian Parton.....	Assistant Preparation Superintendent
D. C. Helms.....	Mining Engineer
A. G. Frank.....	Mechanical Engineer
Samuel Williamson.....	Superintendent, Lansford Shop

lel from the point of connection to the aerial lines outside the station. If one cable should fail, the paralleling jumpers (at the potheads) are removed from each end of it and the other cable allowed to carry the circuit's load. This means that a failure of any one of the six incoming cables cannot cause much of a delay because it can soon be cut loose.

In effect, there is one spare breaker for the six-unit metal-clad structure, since the Hauto Tamaqua No. 1 Tap is held as the spare incoming line. Each panel has an ammeter and a selector switch for reading current in either of the three lines. For short circuit and overcurrent protection of each circuit, Type CO 4-15 amp. induction-type relays in Flexitest cases are used.

No ground protection is provided on the 11,000-volt switchgear at Coaldale substation as this is taken care of by the ground protective relays on the feeders at the Lehigh Navigation's Hauto substation situated approximately one mile away, which in turn is approximately 1,000 ft. from the Hauto generating station of the Pennsylvania Power & Light Co. As one of the main generators at the Hauto power plant is grounded at all times, the 11,000-volt system feeding Lehigh Navigation's operations is considered as a solidly grounded system, even though the neutral is not carried to the operations.



Above—How the 11,000-volt circuit breaker appears when disconnected from the bus.

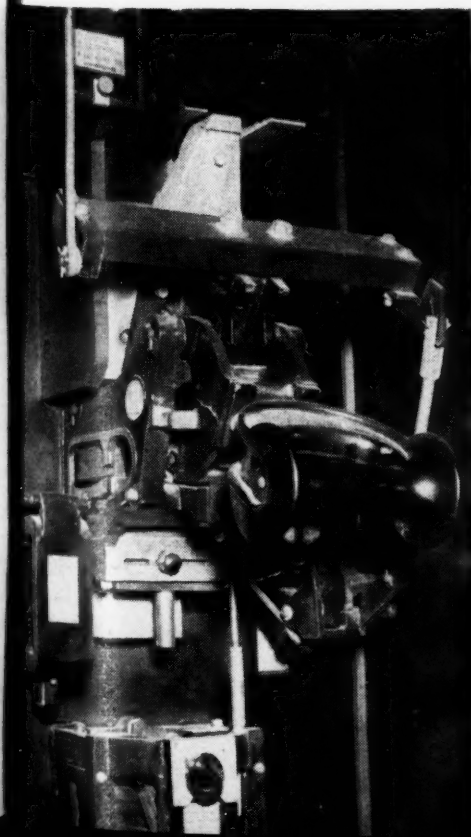
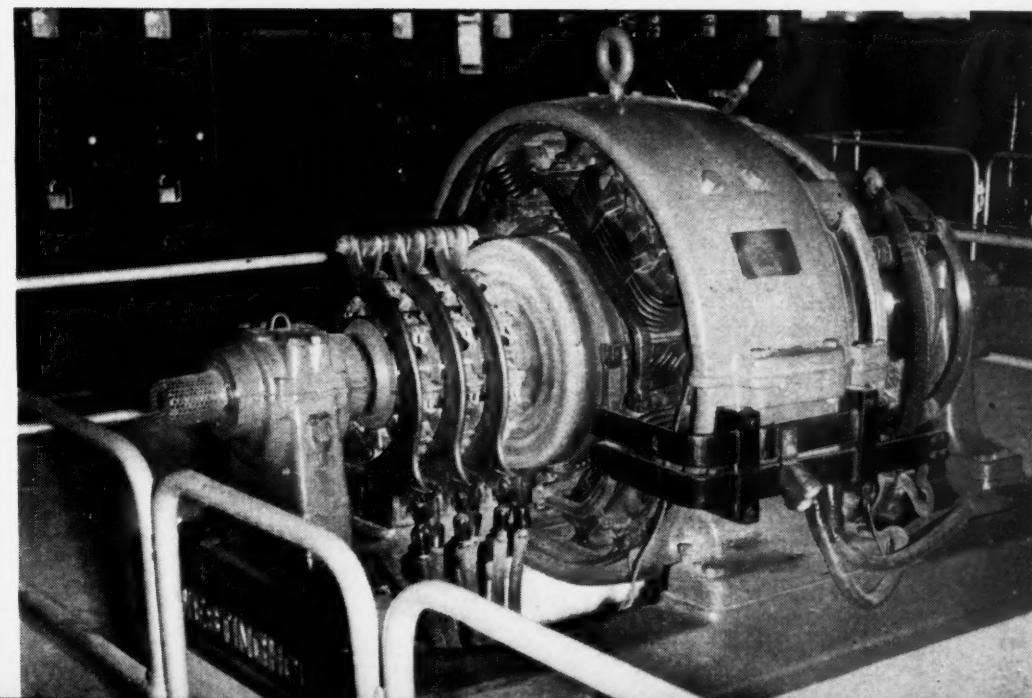
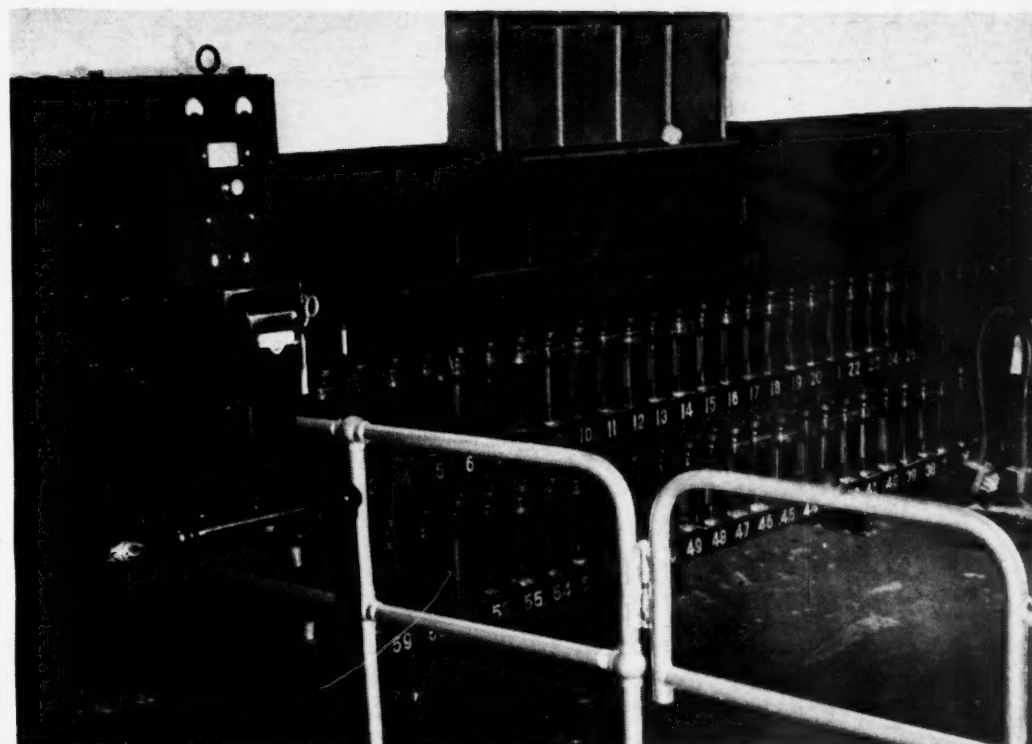


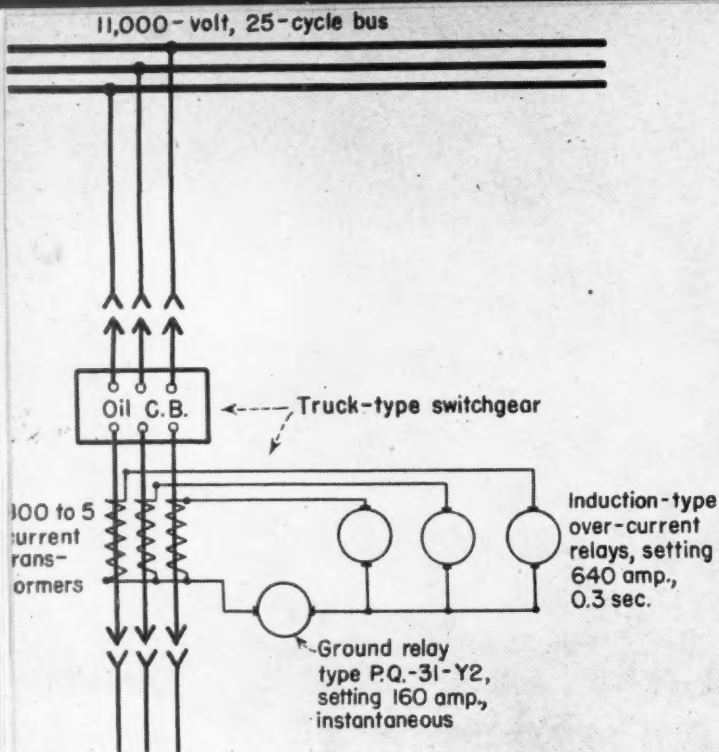
Above Right—John Burnett, junior electrical engineer, checks the voltage of the incoming line.

Right—A 125-volt battery, with rectifier charger, furnishes the d.c. power for closing and tripping the breakers.

Below Right—Even the rotary converters in the center of the station are fenced in.

Below—This 2,000-amp. 275-volt d.c. circuit breaker has an instantaneous series overload trip coil, reverse-current trip attachment, under-voltage trip and an auxiliary switch.





H. E. Arney, electrical engineer, stands in front of the 2,300-volt panel for the 600-hp. synchronous-motor-driven air compressor.

Fig. 3—A ground on the 11,000-volt feeder upsets the balanced condition in the relay system (at Navigation substation) causing a current to flow through the ground relay which trips the breaker.

The earth grounds at this locality provide very good ground connections, never being more than two ohms at any of the main substations.

Each of the feeder panels at the coal company's Hauto substation is provided with overcurrent and ground relays. Schematic connection of these relays is shown elsewhere in this article.

When normal current is flowing from the feeder switches there is a balanced condition in the relay system and no current passes through the ground relay. However, in case of a ground on any one of the outgoing leads an unbalance is created in the relay circuit which causes current to flow through the ground relay. When this current reaches the value of 160 amps., that is one amp. in the ground relay, the ground relay operates to open the oil circuit breaker. With this protection on the line side of the Coaldale substation it is not necessary to provide any additional protection on the 11,000 volt switchgear there.

Each circuit is equipped with a Type CB-2 polyphase two-element watt-hour meter (some on the incoming lines have ratchets for one-way power registration), while the circuits for the converters have a Type CV undervoltage relay, all in Flexitest cases.

A station battery to control switchgear units is a common sight around a power company's substation but is rarely encountered at a colliery or mine. Its advantage make it well worth considering wherever there is a concentration of switchgear. However, there are individual breakers in operation which have their own d.c. supply (an a.c.-to-d.c. rectifying device) for closing.

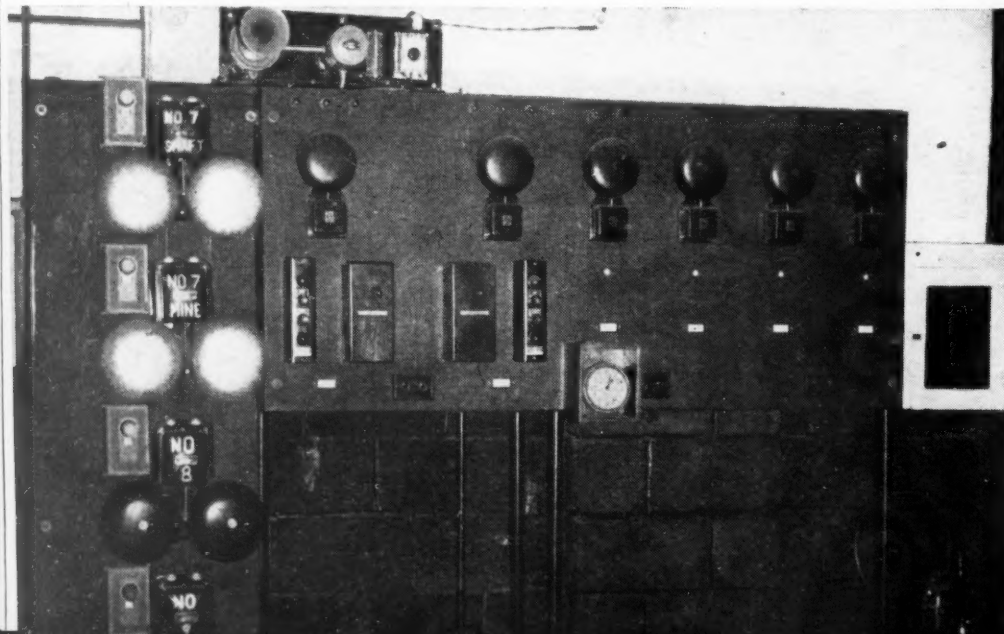
Battery power for closing and tripping solenoid-operated circuit breakers eliminates the careless and inconsistent manner in which manual breakers sometimes are operated. It insures more positive closing of the breaker and eliminates any possible interference with the action of the trip-free closing mecha-

nism. Tripping the breaker with a d.c.-actuated trip coil takes the burden off the current transformer.

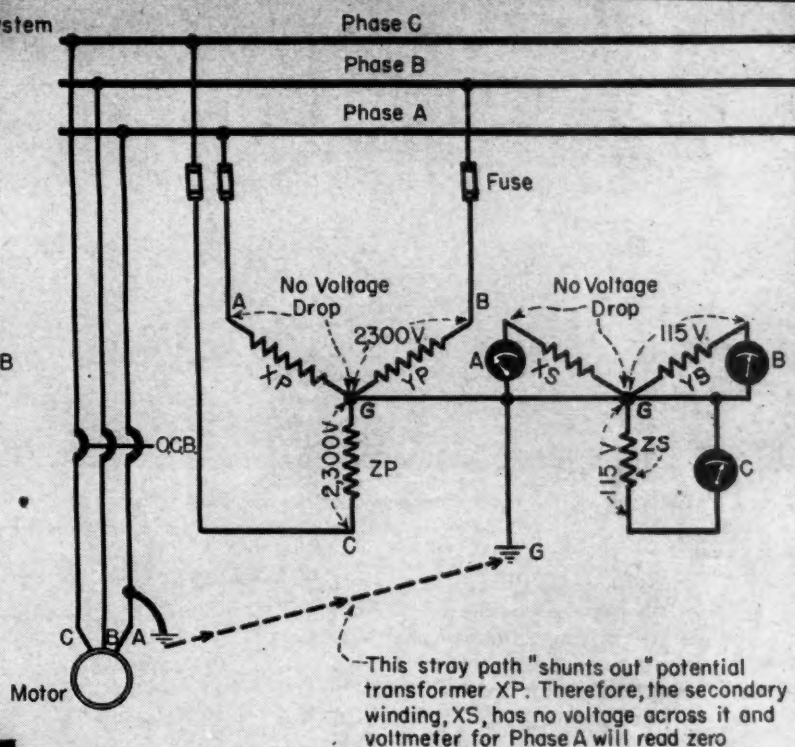
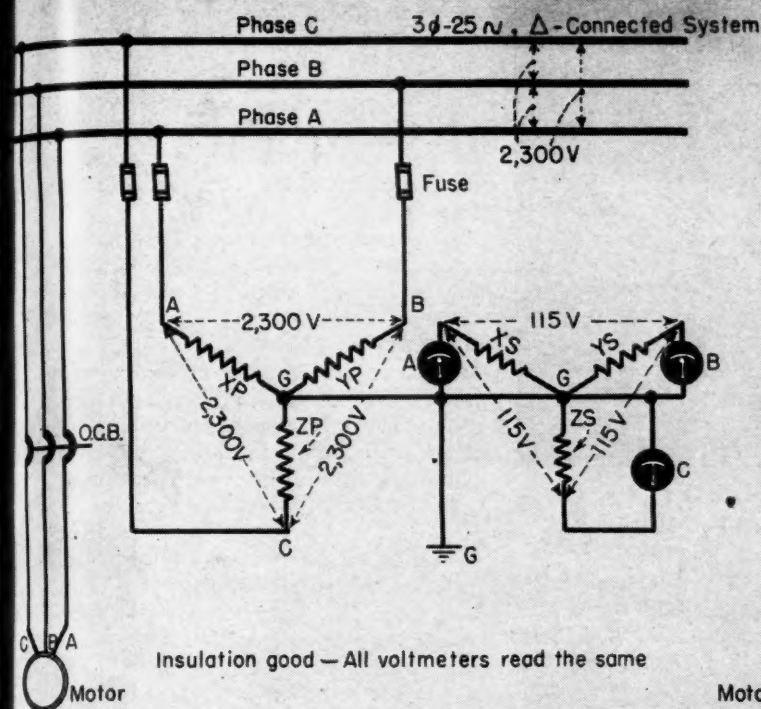
In the Coaldale substation, a Type KXHS-7 60-cell 125-volt Exide battery is charged by a Style 5-Y-7636 6-amp. 115-a.c./120-volt-d.c. Westinghouse Rectox rectifier. This station battery is used for closing and tripping the metal-clad units and also as an emergency supply for the station lights.

Aside from the fact the new 5,000-volt switchgear has double the interrupting rating (or 50,000 kva.) of the old circuit breakers, the most unusual thing about the ten-compartment metal-clad switchgear for the 2,300-volt distribution is the three-phase ground detector. Three 2,300/115-volt potential transformers, with current-limiting fuses in drawout assembly, are connected wye-wye to feed three indicating voltmeters used as ground detectors. The voltmeters, shown elsewhere in this article and also illustrated in a wiring diagram, provide a visual check on the condition of the insulation of the 2,300-volt circuits as long as these circuits are connected to the 2,300-volt bus.

If the insulation of the 2,300-volt bus and feeders is in good shape the three voltmeters will read the same. These voltmeters, though connected in the secondary circuit of the potential transformers, are calibrated to read 3,000 volts for full-scale deflection in place of possibly 150 volts. What they really indicate is the potential of the various



The mine telephone alarms (gongs and lights) and the pumping station controls are mounted in one corner of the station.



Phase A develops a ground (near motor) and voltmeter for Phase A registers zero; Other voltmeters register more than normal

Note:
As soon as oil circuit breaker (O.C.B.) is opened all voltmeters will again read normal

Fig. 4—How the ground detector records a change in the condition of the insulation on 2,300-volt system.

The small voltmeters, as a ground detector, indicate the condition of the insulation on the 2,300-volt circuits.

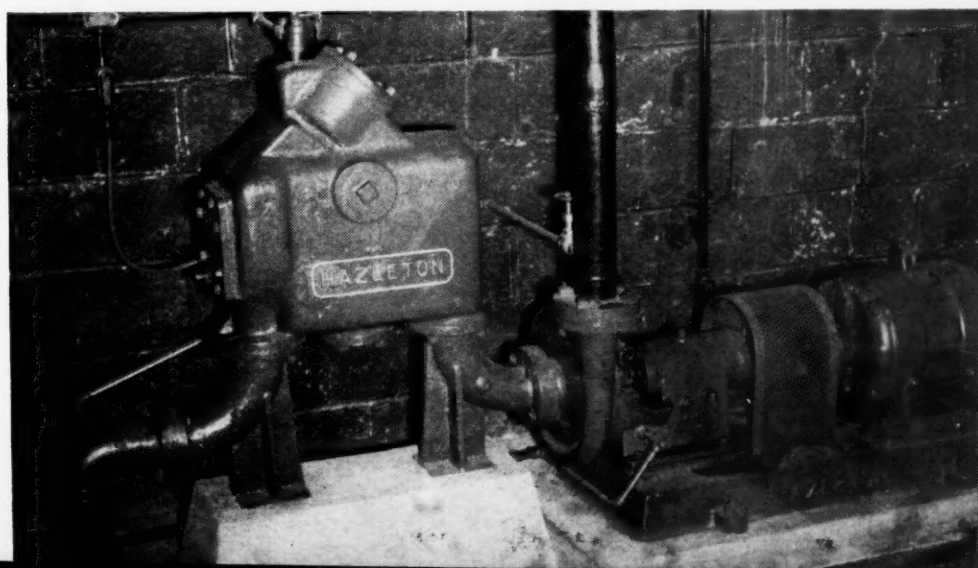
phases, A, B and C, above ground (G). Normally, the voltage from either phase conductor to ground is approximately 1,325 volts when the phase voltage is 2,300. While the voltmeter indicates 1,325 volts, actually it feeds only 66.25 volts since the ratio of primary to secondary turns for the potential transformer is 20 to 1. When the insulation of a phase conductor begins to go bad it will be reflected in a lower reading of the voltmeter associated with that phase.

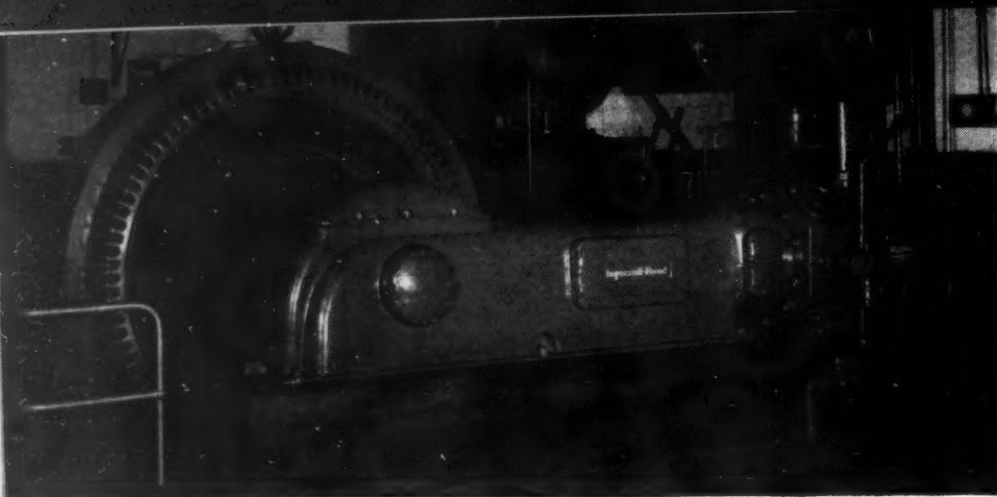
If Phase A should go to ground then G assumes the same potential as Phase A. This means that potential transformer, XP, is shunted out. With no voltage across its primary winding there can be no voltage across its secondary, XS, and its voltmeter will read zero. When this occurs, the other two volt-

meters will read 2,300, since the other potential transformers each get the full strength of the 2,300 volts. Of course, nothing happens except change of voltmeter indication when just one phase becomes grounded. There is no real trouble until the insulation on one of

the other phases goes bad and a short develops between phases by way of this common ground. But, when that time comes, the electrical service is disrupted and production is impaired. Therefore, the real duty of a ground detector is to indicate the first ground. Eliminating

This self-priming pump forces the cooling water through the aftercooler.



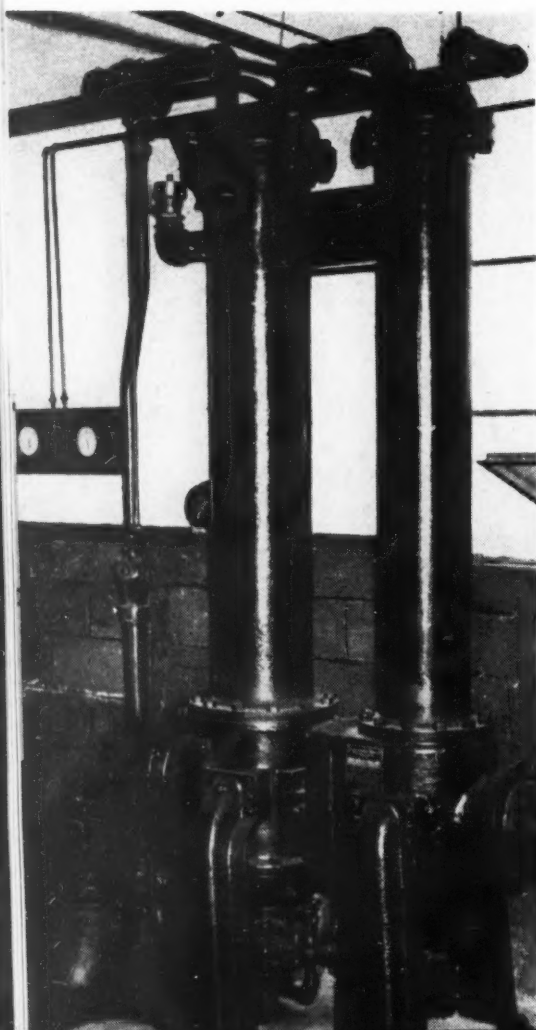


The rotor of the synchronous-motor-driven compressor has extra weight built into it for flywheel effect, eliminating the need for a separate flywheel.

that ground at the close of the shift or on an idle day, before one develops on either of the other phases will avert major disturbances on the system and keep production up.

The ground detector described indicates only for the 2,300-volt circuits. It cannot indicate grounds on the 11,000-volt circuits at the same time—that calls for a separate detector. For complete ground detection of two systems tied together through a 2,300/440-volt bank of transformers, for example, two separate ground-detector units are necessary. Ground detectors are inexpensive and quickly pay for themselves on any three-phase distribution system.

The aftercooler removes most of the moisture and oil vapor before the air enters the distribution system.



While the 11,000-volt system is nominally a delta system and one of the wye-connected generators at the Hauto power plant is always grounded, the company has found that use of arresters for the grounded neutral circuit such as General Electric Thyrite Station-Type Form F, Catalog No. 9LA1F19, rated at 11,500-volts circuit voltage and 9,000 rms. volts maximum line-to-ground, provides much better protection than those formerly used. In the past arresters were selected on the basis of a non-grounded neutral circuit and were similar to the General Electric oxide-film arrester rated at 11,500-volts circuit voltage and 12,000 rms. volts maximum line-to-ground.

Like many other anthracite operations, Coaldale colliery uses much compressed air for drilling coal, caging cars, etc. To get more "dry" air at a better pressure, a new two-stage duplex-type Ingersoll-Rand compressor with intercooler, aftercooler, unloader and five-step clearance regulator was installed in the substation, where a substation attendant is on duty 24 hours a day. The compressor has a 3,078-c.f.m. piston displacement and a rated discharge pressure of 120 lb. per square inch at 1,000 ft. above sea level. At present, the air pressure at the receiver is being limited

to 110 lb. The air is compressed to 30 lb. per square inch in the first stage (30x21-in. stroke) before it passes to the intercooler.

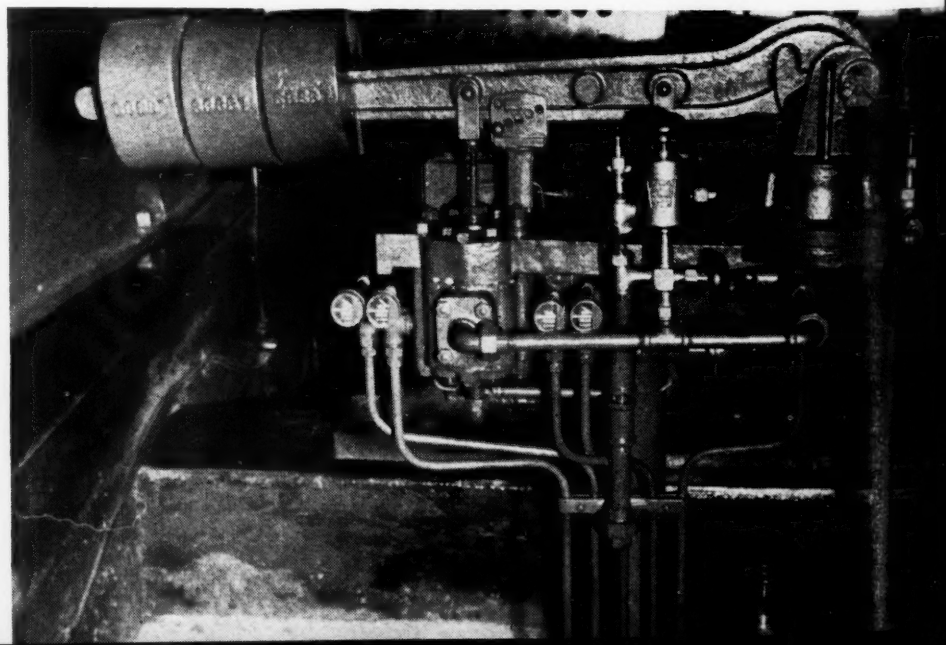
The intercooler saves power by reducing, through cooling, the volume of the air before it enters the second-stage cylinder. It is said that approximately 1 percent in power can be saved for each 10-deg.-F. decrease in the temperature of the air between stages. Intercooling between stages reduces the maximum temperature in the second-stage cylinder (18x21-in. stroke), resulting in better cylinder lubrication and minimizing valve troubles.

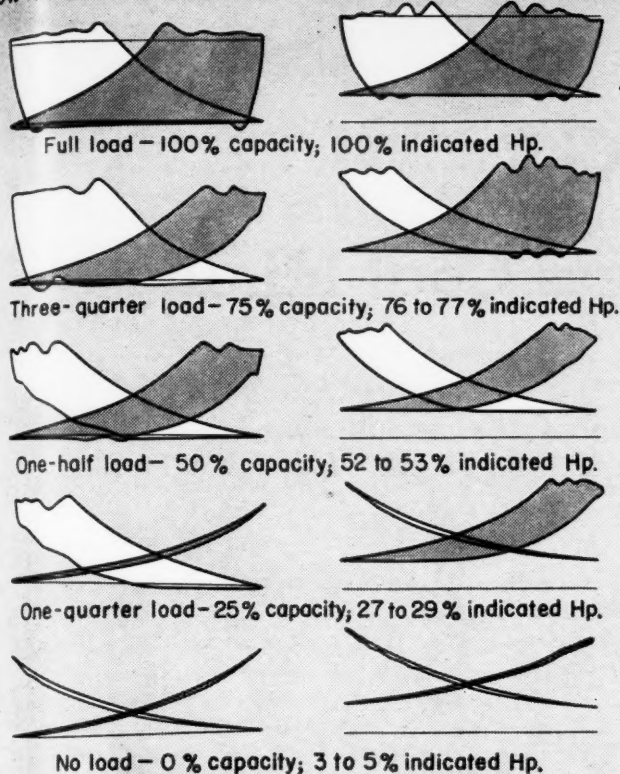
The cooling of the air in the intercooler causes partial condensation of the moisture. The intercooler is equipped with a trap which traps the condensate thus preventing it from being carried over to the high pressure cylinder where it would wash away the lubricant and thus speed the wear of the moving parts.

Both pistons (semi-steel) are cast hollow for lightness and are ribbed for strength. In place of four single rings, each piston has two three-piece rings consisting of two outer sealing rings with a single internal expanding ring which provides the tension and seals the joints of the outer rings. Each piston-ring groove is vented to relieve the pressure under the ring on the suction stroke, thus minimizing wear. All cylinder heads are equipped with channel valves, reported to be quiet in operation and to be self-cleaning.

The volume of the compressor's output is varied in accordance with the demand for air by a Model RA-71 5-step clearance control regulator. It regulates the capacity of the compressor in five approximately equal steps; namely full, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ and no load, keeping the power input in proportion to the volume of air delivered at the discharge outlet. Each cylinder has four clearance pockets, two at each end. Each clearance pocket is equipped with a piston-operated valve

The controls that make for the operation of the compressor.





Step No.	Load	Low Pressure				High Pressure			
		Head End		Crank End		Head End		Crank End	
		Inside No. 4	Outside No. 2	Inside No. 1	Outside No. 3	Inside No. 1	Outside No. 3	Inside No. 4	Outside No. 2
1	Full	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2	$\frac{3}{4}$	Closed	Closed	Open	Closed	Open	Closed	Closed	Closed
3	$\frac{1}{2}$	Closed	Open	Open	Closed	Open	Closed	Closed	Open
4	$\frac{1}{4}$	Closed	Open	Open	Open	Open	Open	Closed	Open
5	No.	Open	Open	Open	Open	Open	Open	Open	Open

Fig. 5—The five-step clearance-control regulation makes for efficient operation of the compressor at all loads.

separate from the compressor's channel valve and controlled by the clearance regulator, subject to a change of pressure in the receiver.

If the compressor is operating at full load and rated discharge pressure and the demand for air decreases, the receiver pressure will rise until, at a predetermined point, the clearance regulator functions to open the first set of clearance pockets; that is, one clearance pocket for each cylinder. Then, approximately 25 percent of the air being compressed will pass into the clearance pockets, cutting the capacity to 75 percent of full load. On the return stroke of the piston, the air thus trapped in the clearance pocket expands again, giving up its power to the piston. Should the demand for air continue to decrease, the second set of pockets open, cutting the capacity of the compressor to 50 percent, etc., until, with all the pockets open, the machine is completely unloaded and no air is delivered to the receiver. Then, as the demand for air increases, the clearance pockets will close, one step at a time, until the capacity of the compressor meets the demand for air.

During starting, an unloader on the intercooler and cylinder valves on the high-pressure cylinder unload the compressor until the motor has been brought up to working speed. This is necessary because the constant-speed synchronous motor driving the compressor has relatively low starting and pull-in torques. The Type U-57 magnetic unloader also unloads the compressor when the motor stops or when

there is a momentary dip in the line voltage. In the latter case, the field circuit opens and the motor operates as a squirrel-cage induction motor. As soon as the voltage returns to normal the field circuit is closed and the compressor takes up its normal load.

The unusual thing about this air compressor installation is that the compressor is served by an aftercooler. Aftercooling compressed air reportedly eliminates: (1) washing lubricant away from tools and machines; (2) freezing of moisture in valves, ports, etc.; (3) possibility of explosions or fires in receivers or piping; and (4) straining of lines from alternate expansion and contraction.

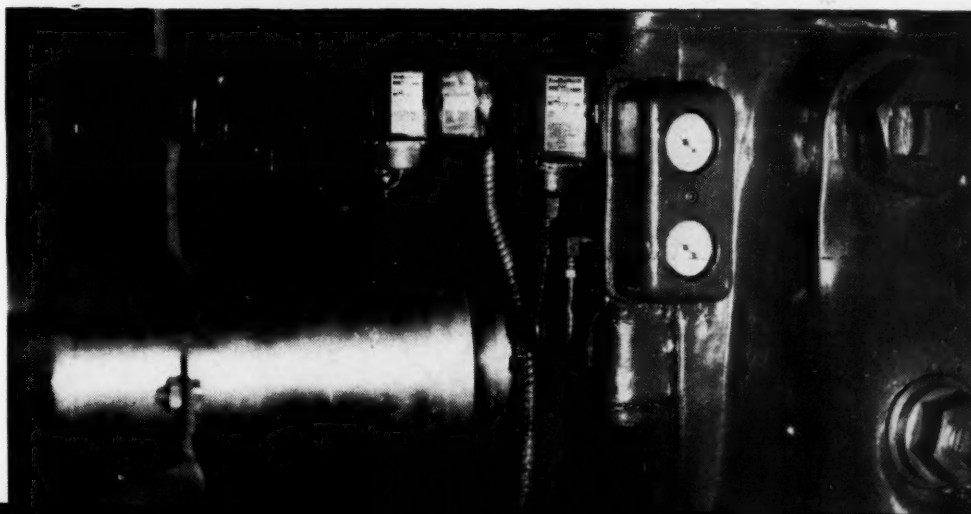
The aftercooler removes 90 percent of the moisture and oil vapor immediately after compression and before the air enters the distribution system. It reduces the temperature of the air to a point where most of the moisture and oil is condensed by bringing the hot air leaving the compressor into contact with pipes through which cooling water is constantly circulated. Cooling water

at the rate of 27 g.p.m. flows through the aftercooler counter to the direction of the passage of the air.

Men operating the air drills at the face already have noticed a marked difference in the operation of equipment since the new compressor and aftercooler have been in operation. The air drills seem to have more pep. With dryer air, less of the lubricant is washed away. Therefore, the drills get better lubrication and run better. Thus drill maintenance costs will be reduced.

Extra weight is built into the rotor of the 600-hp. 2,200-volt Westinghouse synchronous motor that drives the compressor so that an additional flywheel is not necessary. Because the air within the cylinder is compressed to its full terminal pressure with each stroke of the piston, the piston always is cushioned at the end of its stroke. With the inertia loads of the reciprocating parts being opposed by air loads, together with the 5-step clearance valve regulation, a more uniform part-load motor torque is had.

Pressure and temperature gages constantly check the force-feed lubrication system.



SUPPLY HANDLING

For Efficiency in Trackless Coal Mining

Transportation of Men and Handling of Supplies Are Twin Problems In Thin Coal—Dead Pan Lines, Hand Carts and Trucks, Reversed Conveyors, Tractor-Trailer Units and Power Trucks Meet Mine Problems

TRANSPORTATION has never ceased to hold a top place among the foremost problems in coal mining. Efficiency in hand loading depended largely on promptness in pulling the loaded car from the working place and bringing back an empty. When mobile loading machines came into the picture car service assumed still greater importance. With hand loading, the problem of handling supplies consisted only of loading them into the particular empty destined for a certain place.

Introduction of mobile loaders brought some complications due to lack of time for loading and unloading supplies. Consequently more operators put on supply crews to do the job on an off shift. In thin seams, transportation of the coal, formerly by far the greatest problem, has been largely solved by shaker, chain-flight and belt conveyors. A parallel development has been conveyors and shuttle cars behind loaders in thicker coal.

The elimination of the mine car, however, took away the old reliable means of moving supplies to the face. What has

come to light in solving this new problem, and what are the trends and outlook? The following material attempts to supply some of the answers based on observations of the Coal Age editorial staff and a personal survey of practices and opinions at a number of trackless-mining operations.

In seeking the answers, the transportation of men should not be passed over hastily. The picture has been altered by such changes as portal-to-portal pay, substitution of conveyors for mine cars, more mining in thinner seams, less taking of top and/or bottom in sections and rooms, thereby reducing travel height, and, finally, less willingness on the part of workers to exert themselves in traveling to and from working places.

Belt conveyors, introduced principally to meet the low height problem, have proved so efficient in that service that they have been installed in many thick-seam mines despite the opinions of some operators as expressed tersely by one: "If you have height enough for tracks and may need tracks for supplies then you have no business with belts." Local

viewpoints, influenced by mine capacity, mine life, length of haul and natural conditions, control such opinions. Time will tell. In thick coals, where tracks with adequate roof clearance may be much less expensive to install and maintain than in low coals, the problem of whether to install supply tracks or handle the supplies on belts or by other means immediately comes up.

Moving Men on Belts

Carrying men on belts is a ticklish subject because a lot of it is being done in the face of opposition by state and federal inspectors. Advocates admit a hazard but argue that hazards also exist in walking, crawling or even riding in mine cars. Obviously, a man riding a belt in very low coal can get his neck or back broken if he raises his head under a crossbar or rough spot in the roof. But, so the argument goes, a man riding in a car may be seriously hurt if he raises his head beyond the limit of clearance. Getting on and off of belts while in motion, whether in low coal where the man lies flat on the belt or in high coal where he rides in a standing, sitting or kneeling position, is tricky until a man becomes accustomed to it. Data so far available do not seem to indicate, however, that riding belts is unduly hazardous or even more hazardous than other transportation means.

In many mines, future methods of handling supplies will depend solely on the practice as to men riding belts. Generally speaking, the mines where the practice is prohibited are the ones operated by the larger companies. It is only natural that a man wants to ride the belt instead of crawling 2,000 ft. or more in a 30-in. seam after completing his shift at the face. In coals of that approximate thickness or less the alternative is to shoot top to provide a walkway along the belt, but that expense may cancel out a lot of the advantage of the belt over track haulage.

Some months ago several companies reported plans for installing electric eye



Dead pan line for handling supplies in shaker mining is shown at the left of the live line, loaded with parts and supplies for one pan length of face advance.

protection near the heads of main belts on which men ride out, this to automatically stop the belt in case a man appears in danger of riding on through the head. It is known that this protection has been installed in at least one mine. Now, some operators talk about extending that protection to the tail, or inby ends, of any belts that are reversed to carry men into the mine or section.

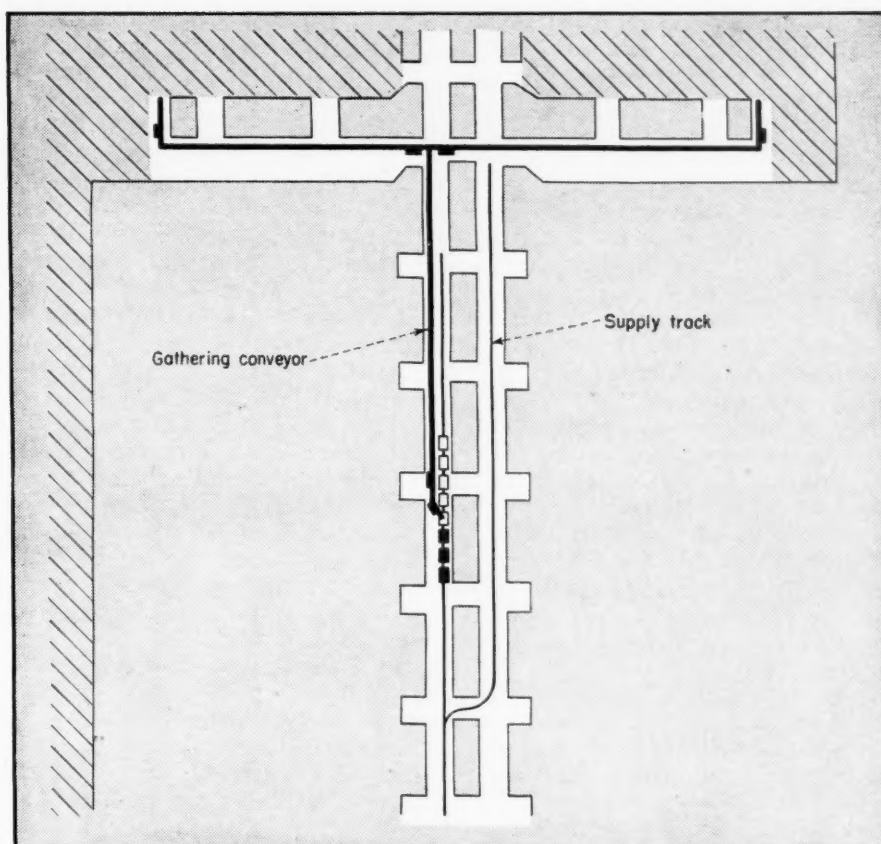
Few disasters fortunately, have occurred where rescue work had to be carried out by crawling distances of 2,000 ft. or more where height is as low as 30 in. In time, that consideration will exert a greater influence on the problem of travelways for men in low coal. In some mines in high coal, men regularly mount and get off of belts at speeds up to 375 f.p.m. A platform usually is built alongside the belt to make it easier to step on and off where men ride kneeling or standing. One operator using belts in coal over 6 ft. thick reported plans underway to increase belt speeds to 500 f.p.m. but in that case the belts will be stopped for men to get on and off.

Methods of handling supplies in conveyor mines and in conveyor sections of mines with main line tracks fortunately are not complicated by any particular hazards beyond any that may be involved in transporting men. Consequently, these methods assume patterns giving highest production and lowest cost per ton.

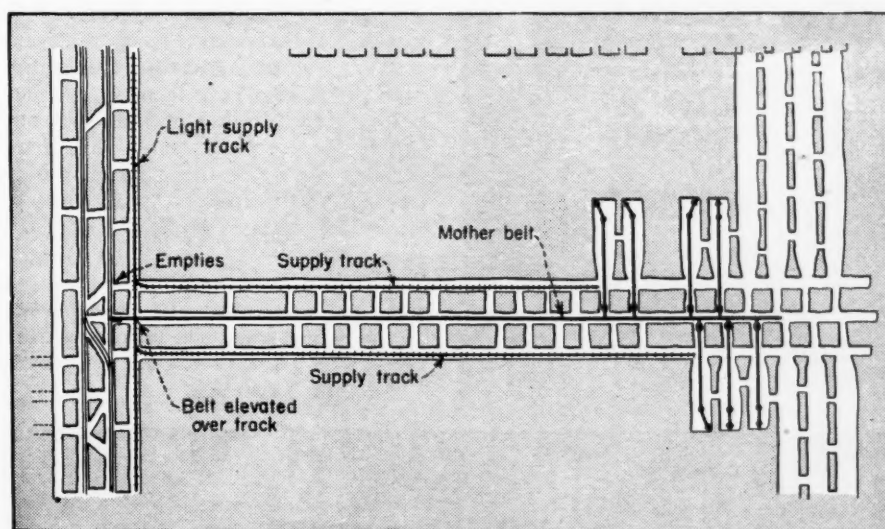
Supply Handling in Rooms

The first general application of conveyors consisted of room units 250 to 300 ft. long discharging directly into mine cars and that simple arrangement still prevails with many of the conveyors now in use. Top or bottom is taken in the haulage heading of the room entry to provide adequate height, but in the rooms only the marketable coal is taken and the height may be anything down to 20 in. Thus, the supply problem is to move the materials 250 to 300 ft. under the low top.

Chain-flight conveyors are reversible and thus can be adapted to carrying materials to the face. In all but a few instances, this type of conveyor is hand loaded, the exceptions involving low-type mobile or special loaders discharging to the conveyors. Probably 75 percent of these conveyors are reversed and put to the task of carrying supplies to the face. Where chain conveyors are not reversed, the major reasons given are: (1) maintenance is increased on some types; (2) nothing should interfere with moving the coal. Although a number have been sold, shaker conveyors these days usually are not reversible for carrying supplies to the face.



Typical supply-track layout where gathering conveyor is used.



Where mother belts are employed, a number of operators put supply tracks in both side headings. This saves manhandling material through doors in stoppings and across the belt.

This, however, has not been a problem of such consequence as to affect shaker installation noticeably, although some operators have selected chains because of their adaptability to reversing.

Where shaker conveyors are used, a fairly new but now widely used method of moving supplies from room neck to face is the dead pan line. This dead line consists of a line of pans without a drive fastened together temporarily and resting on the bottom alongside the

active pan line. Each pan of this dead line is loaded with the necessary timbers, caps, tamping bags, rock dust, cradles and rollers for one cut. The dead line is dragged forward one pan length each cut by the mining machine. The inby pan of materials is disconnected and then added to the live line. At the room neck, another pan is attached to the dead line and in turn is loaded with supplies.

When the room has been driven half

way no more pans are added to the dead line. The last dead pan reaches the face in time to become the last pan to be added to the live line. This supply method is low in cost, free of trouble and requires little physical exertion on the part of the men.

In many shaker-conveyor mines, supplies are carried on a low truck with small wheels running in the pan line. Several manufacturers supply these and some mining companies make them in their shops. The truck is either pushed by hand or is pulled back and forth by ropes. Questioned on choice between these methods, one superintendent, who has his supply men push the truck, said that the rope method involves more man-hours because it requires two men to operate the truck instead of one. Another operator, who gets a high efficiency in 4½- to 5-ft. coal using room shakers discharging to cars, uses the pan truck but no rope, claiming that in his height of seam the men have no difficulty pushing the truck along the pan line. Small hoists are used in some pitching operations to pull timbers and other supplies up from the room neck to the face.

In both chain-conveyor and shaker work quite a number of operators pre-

fer to use a small buggy running on the bottom which the supply man pulls with a tongue. Bed dimensions typical for the four-wheeled type are: width, 26 in.; length, 48 in. Bed height is 10 to 12 in. Wheels are rubber tired, steel or wood. When small pneumatic tires, such as wheel-barrow size, become readily available rubber wheels will predominate. It is important, however, to use a wheel or tire with as large an outside diameter as possible, considering the limitations of truck weight and coal height, thus making it easier to move the truck over small lumps of coal or rock or irregularities in the bottom. Some use a barrow truck with two wheels positioned near the balance point and a third wheel at one end. The bed may be flat or curved like a trough and lowness of the bed sometimes is attained by using a drop axle.

To carry shaker troughs, one company has developed and is using a combination truck consisting of a detachable axle with rubber tires and a handle arranged whereby the shaker pan is attached to the axle by drop pins and serves as a bed for carrying other materials. The handle can be hooked to the trough-fastening eyes for a choice of pushing or pulling. The same handle can be hooked directly to the axle for pushing or pulling the truck back empty and at the same time carrying back some light materials.

With shaker conveyors the supply problem usually is influenced by questions involved in moving the drives and pan lines to other rooms. In many instances, most of the pans are moved through the nearest crosscut while in others, for instance where the roof may

be bad or blowers are used and no crosscuts are made, all the pans are brought back to the room neck. In such operations, the usual method is to shake the pans out on the conveyor while operating it as if it were carrying coal. In low coals, however, storage space for the pans at the room neck may prohibit bringing out all the pans without delaying the moving of the drive.

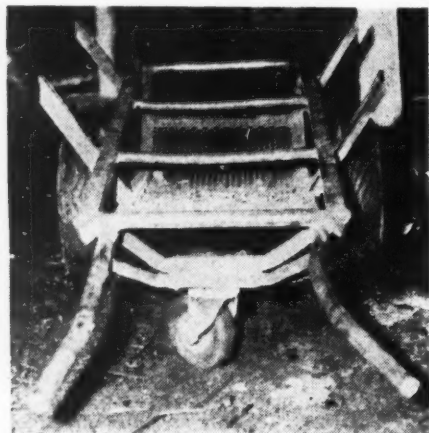
One company using shakers with ducks in 32- to 34-in. seams has found that moves are speeded by shaking out only two or three pans, then moving the drive and getting it started in its new location with these few pans. In the meantime men slide the inby pans out on the idle line.

When to Move Supplies?

When is the best time to move supplies from the room neck to face? If general practice is a criterion, the answer is during the shift. At a few mines, supply crews do it on an off shift. Most operators object to this, however, on the ground that it divides responsibility, duplicates travel, may complicate the maintenance of conveyors and calls for special supervision in piling the material where it is handy but out of the way. Advocates of off-shift delivery, however, include one operation where entry belts 1,500 ft. long are employed in 50-in. coal. Solely as a result of difficulties in supply delivery, this operation changed from three- to two-shift mining, reserving the third for supply delivery by reversal of the belts. The result in this instance was a material increase in tons per man-shift from the conveyor sections.

If it is assumed that common practice is taking supplies from room neck to face during shift, the question then becomes, "Who does the work?" In a few mines, the job is put up to the boom man, which seems to work very well when production from the room is not too continuous. Most operators, however, prefer to designate one man of the face crew to handle the supplies. Seam thickness, room width, quantity of timber required and other local conditions govern the exact arrangement. In one efficient mine working duckbills with crews of four men each, one man in each crew is assigned to move the timbers and supplies to the face, working the remainder of the time as a regular face man. In another section of that mine, where rooms are worked by hand loading onto chain conveyors, one supply man handles two rooms. He also pans up and does the timbering. A four-wheeled truck pulled manually is the transportation method in both cases.

At another mine, where low-type mo-



Left, rubber-tired cart for chain-conveyor pan, parts and other materials; bottom, cart loaded with pan, rock dust and a section of chain.



bile loaders working rooms 30 ft. wide discharge to chain-flight room conveyors and those load directly to the mine cars, there is a supply man for each room. His extra time, after bringing posts and supplies to the face in a three-wheeled push barrow running on the mine bottom, is spent cleaning around the room conveyor. With a loading machine, spillage from the conveyor is of course much greater than with hand loading. A special mobile conveyor loader with its boom swiveled to the end of the room conveyor now undergoing trials reduces the spillage at the end of the room conveyor.

In some mines, where supplies are brought to the room neck in cars during working hours and the boom man has the job of unloading them ready for the face supply man, the boom man has the additional job of making dummies for shooting.

Gathering-Conveyor Systems

Proceeding from individual room conveyors discharging directly to cars, the next step is a gathering conveyor several hundred feet long carrying the coal from two or more room conveyors to a single loading point where one boom man suffices for several rooms and the car spotting and haulage are simplified. This gathering-conveyor system is used in both room and semi- or modified longwall systems, and the track usually parallels the gathering conveyor and extends inby close to the long wall face or to the outby working room.

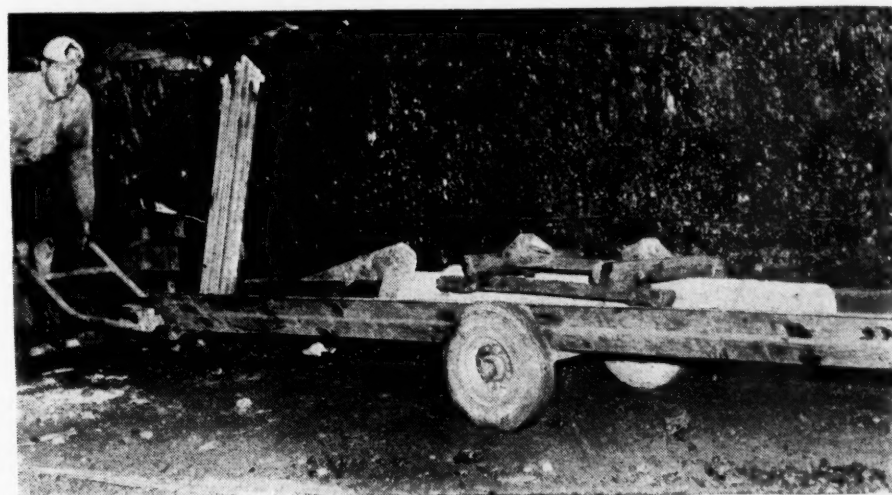
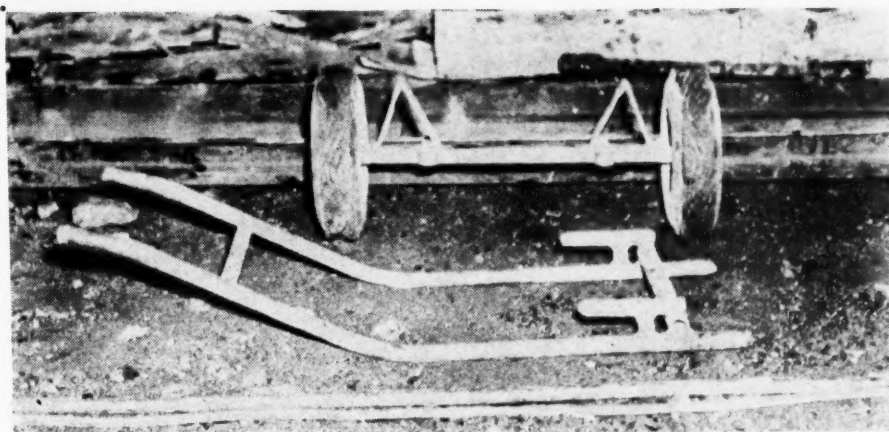
If, in this system, but two rooms are worked or the layout is retreating semi- or modified longwall, it usually is preferable to unload supplies from the mine cars at the end of the track: in other words, near the outby ends of the room or wall conveyors. The alternative, if the gathering conveyor is a chain type, is unloading the supplies from the cars at the coal-loading point, then reversing all conveyors to carry these supplies to the faces.

At one mine where officials have had long experience with chain conveyors in 36- to 42-in. coal and where the standard setup consists of two room units on opposite sides and a gathering unit parallel to the track, timbers and other supplies are delivered to the end of the track by a supply crew working on the off shift. The room crew transports these to the face at the beginning of the shift by reversing the chain room conveyors.

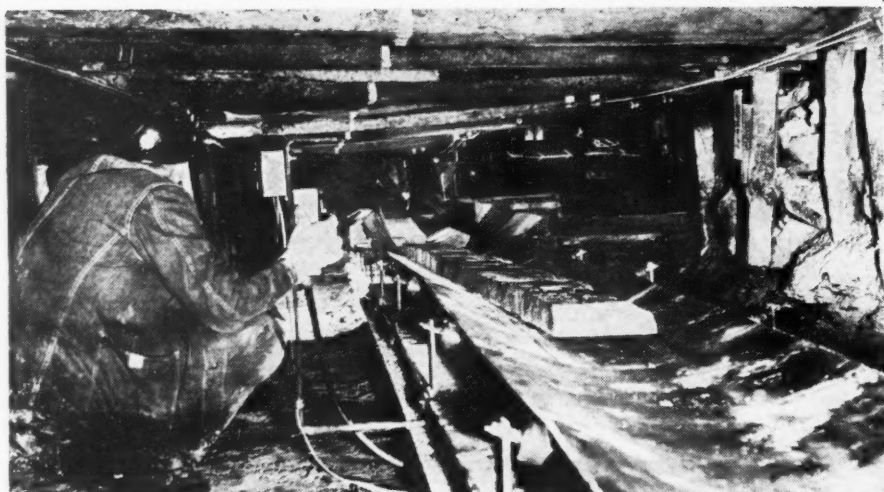
At another operation using a modified longwall in 42-in. coal with mobile loaders delivering to chains and with a similar gathering-conveyor and track arrangement, a night supply crew unloads crib blocks, posts and other supplies

from the cars at the point where the two wing or longwall conveyors empty to the gathering unit. This crew then reverses the two wall conveyors and delivers most of the material to the inby end of the face. From that daily storage

point, timbers and other items are distributed during the loading shift by placing them on the conveyors during their normal operation of carrying coal. Care, however, must be exercised to avoid letting any materials go on by and



Top, two parts of a push or pull truck for shaker pans: center, holes in the shaker pan accommodate drop pins holding the pan on the axle. The handle is shown hooked into the eye for pushing. Other lugs are provided for hooking it on and pulling; bottom, handle hooked to the axle instead of to the end of a pan.



Jogging control with pushbutton and dynamic braking of belt make handling timbers and other materials easier and safer.

into the mother conveyor. The night supply crew at this operation, does, however, unload a limited quantity of cribbing blocks along the face, but never so much that any have to be moved inby during the loading shift.

The following, while it may be an isolated case, does illustrate the importance of the supply problem in conveyor mining. A few years ago, after a company had tried conveyor mining with hand loading onto conveyors for several months in 36- to 44-in. coal, the system was changed to driving narrow rooms by hand loading into mine cars. The track then was used to install two 40-ft. face conveyors and a room conveyor for widening on the retreat. The track was maintained for carrying supplies and bringing out the dismantled sections of face and room conveyors.

Operation in Low Coal

A belt line up to 2,000 ft. long to carry coal from chain or shaker conveyors to the cars was the third step in the evolution of conveyor mining. If the coal is as low as 30 in., handling of supplies and travel of men may become closely related problems. Assuming that the men crawl in or are carried on the belt, the supplies usually are delivered from the mine cars to the room necks by reversing the belt. In most cases, this is done by a supply crew working on the off shift. In a few instances, the shift going into the section takes the supplies in on the belt with them.

Where a section belt with chain or shaker room conveyors is used in thicker coals, say 42 in. and up, the installation of a supply track paralleling the belt or the use of battery or cable-reel supply trucks, power tractors or pony-drawn

wagons enters the picture. If shuttle cars transfer the coal from loading machines to belts, they also are often pressed into service to deliver materials from the inby end of the belt or, in exceptional cases, all the way from the car-loading point.

There are now numerous mines in operation in which belts constitute the main and intermediate haulage. This last step again pushes forward the supply-delivery problem, which plainly resolves itself, however, into two categories: low coal and high coal.

What is considered low coal in some parts of the country provokes argument in other sections. No definite line can be drawn but, for the purpose of this discussion, it might be considered that low coal is that in which travel of men long distances under their own power becomes very tiresome—say, under 36 in. Inasmuch as practically all the mines with conveyor main haulage are new operations and there is a tendency toward allotting smaller areas to each mine opening, distances are not great. A mile or so of main-haulage belt and 2,000 ft. or so of cross-entry belt is the usual maximum for a low-coal mine after a few years of operation.

Practically all such mines, when they start out, operate without supply tracks and carry the materials in on the belt. Supplies are handled for the most part by a supply crew working on an off shift. It has been the practice at some mines, however, especially during development, to have an off-shift yard crew load the main belt with all the materials required for the loading shift and then to have the men going in on that shift take the supplies with them. At a section transfer point the crew for that section takes off the main belt all the supplies they need. A man is stationed

at the inby end of the section belt to remove the surplus.

An operator with considerable experience in handling materials on belts operating in reverse has found that safety, especially in low seams, calls for belt controls that include jogging and dynamic braking. To keep the belt moving in reverse a supervisor must keep his finger on the jog button of a control station. The dynamic braking insures a quick, accurate stop regardless of grades and loads.

Some of the older and more extensive full-conveyor mines are equipped with tracks for hauling men and materials. Battery locomotives are favored for this job because they require no trolley wires and in some cases because a.c. power is used exclusively for all inside machinery. For the lowest coals, the bodies of man cars are merely flat platforms on trucks with very low wheels or on trucks with drop axles. The men lie practically flat on these cars.

More Belts Used

Despite some opinions quoted in preceding paragraphs, the high-coal group of mines using belt-conveyor haulage on the main lines to the outside is growing. For the most part, these are new mines or new sections of old mines opened in the last 4 or 5 years. In these high-coal mines, where fair to ample height is available without taking top or bottom, the installation of tracks for transporting men and supplies finds a wide preference. At a new, large mine opened in Kentucky in 1943, with belt haulage on the main and all cross entries, the management installed at the beginning a system of supply-haulage and man-transportation tracks consisting of 40-lb. rails on creosoted ties with permanent bridges over belt conveyors.

Loading at this operation is done with crawler machines and gathering with shuttle cars. The mining height is 66 in., of which 48 to 52 in. is coal and the remainder is draw slate. All items of underground equipment, except the battery-powered shuttle cars, operate on 275 volts d.c. That is at least one reason why the supply locomotive is operated from a 275-volt trolley wire. Danger from the wire is not great at that mining height compared to a wire in low coal.

Another new conveyor-haulage mine, opened in 8-ft. coal in West Virginia late in 1943, was developed to a large tonnage while all supplies were carried on belts. In 1945, the management installed supply tracks and a trolley locomotive. All supplies, except additional sections of belting, are now taken in in cars. To reduce the number of belt splices, lengths of 1,000 ft. each are in-

stalled. As the shipping reels are too large to take in on cars, the belting is unreel at the portal and fed onto the main-haulage conveyor operated in reverse. Crawler loaders are used in that mine, also, and the power is 275 volts d.c. The shuttle cars are powered through trailing cables.

The possibilities in carrying materials on belts are indicated by the fact that in a few mines, at least, shortwall cutters, chain-conveyor drives and pumps have been so transported. To carry the mining machine at one property, it was put on a long cradle to distribute the weight on several idlers. This cradle consisted of two timbers 4x8 in. by 14 ft. long. Two 2x2x8-in. pieces were fastened crosswise, one at each end, to ride on the sides of the belt and maintain balance.

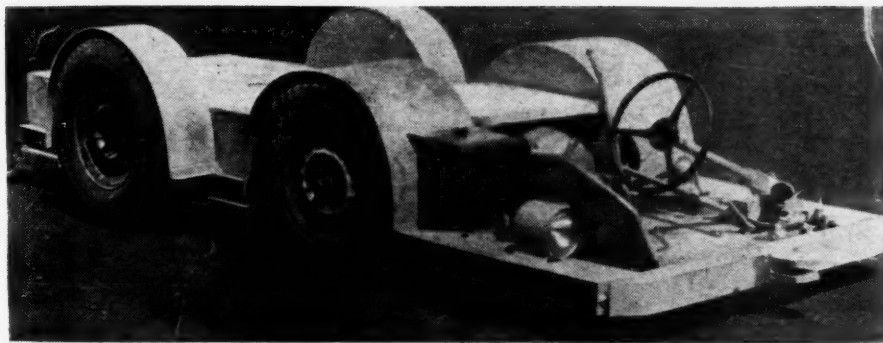
While the drums and ropes of cutting machines are used to move conveyor drives in many mines, operators who have been at conveyor mining the longest usually frown on this as a regular practice. They say it is hard on the cutting machine mechanism, ties up an experienced machine operator and is not as quick as using a hoist, such as one built for car-spotting duty or especially for moving conveyor drives, pan and other equipment.

Conveyor Self-Propelled

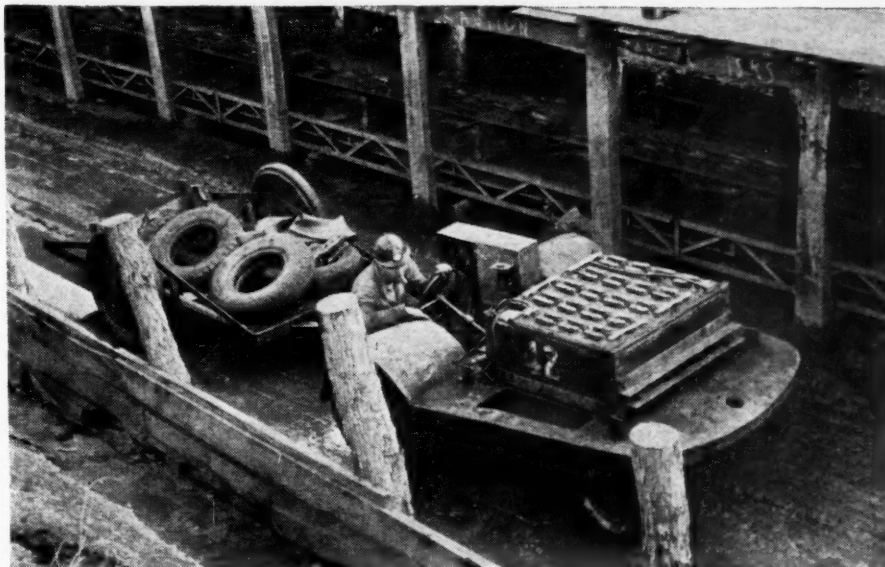
To simplify and speed up the job of moving chain-conveyor drives and pan lines, an operator in eastern Kentucky has equipped the drives with demountable axles, rubber-tired wheels, steering mechanism and a chain and sprocket connection to the conveyor motor, so that one man can drive the unit to a new location under its own power, using a trailing cable (Coal Age, January 1945). Recovering 38 in. of coal from a 42-in. seam, using belt haulage to the tippie and hand loading onto chain conveyors, this operation achieved an average of 12.96 tons per man-shift for all employees for a period of 10 months. Mine officials give a lot of the credit to rapid moving of the conveyors.

One manufacturer recently added a wire-rope crab reel to its crawler truck designed for carrying shortwall cutting machines used in conveyor and other trackless mining. The crab is used to load conveyor drives or other heavy equipment onto the truck. Originally these trucks were without crabs because mining machines load by their own feed or tail ropes.

In low to medium seams, a crawler tractor, powered by a battery or through a trailing cable and pulling rubber-tired supply cars, constitutes one method of moving supplies about the section or bringing them in from the outside if



One mine's answer to the problem of handling parts and materials in trackless mining—a four-wheeled truck with steering gear and platform or bed. Hitches also permit towing and pulling when necessary.



Battery-powered tractor with trailers for handling parts and supplies in trackless mining.

the main haulage is a belt. In the latter case, these tractors have been confined mostly to mines that have been developed only a mile or so from the portal. At one Ohio mine, using track main-line haulage, belt section haulage and duckbills, 6- and 8-ton cable-reel crawler-type tractors 30 in. high are said to be doing an excellent job of moving materials and equipment.

The shuttle car is pressed into duty to carry supplies clear from the portal to the face in many of the newer belt operations where seam thickness allows the use of low-type mobile loaders served by such cars. Objections are that the shuttle car is too expensive, heavy and large for that duty, that it is not available during the loading shift and that it should be left idle during the off shift so that, if it is equipped with a battery, it can be charged and/or the maintenance crew can make necessary inspections and repairs. To meet these objections, rubber-tired or crawler-type supply trucks are used by a number of operations.

Returning to the problem of getting

men into belt-conveyor mines in seams around 30 in. in thickness, it is recorded that, after a number of years of experience without special travelways with additional height, some operators have concluded that it pays to shoot top alongside the belt 4 to 5 ft. wide to provide ample height for men to walk upright. Top conditions largely govern the first cost and maintenance of a travelway of these proportions.

Summing up the problem of transporting men and supplies in trackless mines, it is apparent that the industry has not yet had sufficient experience and carried on enough interchange of thought to agree on a best system for even the several conditions most commonly encountered. However, trends in evidence are: (1) providing better and quicker means for men to get to and from the working places; (2) handling supplies by some means that will not interfere with coal production equipment; and (3) recognizing that real money must be spent for facilities to handle supplies if that job is to be done cheaply.

STRIP VOLTAGE

Improved by Field-Boosting Generator

Improving Power-Factor Increases Distance Stripping Equipment Can Be Operated Away From Substation by Improving Voltage Regulation
—D.C. Booster Generator in Synchronous-Motor Field Does the Trick

By R. G. GEHLEN

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St. Louis, Mo.

GENERALLY speaking, a strip mine is furnished power by a utility company. The power company's voltage is reduced to what is commonly known as pit-line voltage, or approximately 4,160 to 4,600 volts, three phase, 60 cycles. Sometimes, strip mines find themselves in one of two classes, or both, as to how well their voltage stands up under peak loads. For example, the distance from the substation at which they operate their shovels may become too great or the power company's generating station may not be able to deliver the required energy to the substation with an acceptable regulation. Should this be true, then the distance the shovels can be operated away from the substation is proportionally reduced and becomes the subject of this article.

As a rule, any time the combined peak loads of shovels, draglines, loaders, coal-preparation plants and auxiliary equipment causes a 15-percent drop in line voltage, any one machine may drop out of synchronism or slow down, depending on whether it is a synchronous or induction-driven unit.

Copper Size and Reactance

Depending on the load, it is economical to increase the size of copper only to a certain limit. Then, even if this so-called top size is exceeded, the line regulation is not helped materially due to the natural reactance of the line, which is a major factor as far as delivered voltage is concerned.

The maximum distance a combination of loads can be operated away from the substation is that at which the voltage drop of all the lines and transformer stations does not exceed a value at which the synchronous machines drop out of step or the magnetic starters of industrial motors drop the motors from the line.

As is well known, when a line starts to load up and the power-factor of the load is normal, the voltage will start to decrease. As the voltage decreases the power-factor becomes increasingly more lagging. Now, should the various loads of the shovels, draglines, tippie motors, etc., all peak at once, the voltage will drop according to the size of copper used and the power-factor of the load.

Let us say that in a specific case calculations show that 1/0 or 2/0 wire is practically correct for the loads carried and that further increase in distance from the substation is much desired but is not possible because of increased line regulation. To realize maximum distance away from the substation for a specific wire size the combination of loads should yield a unity power-factor condition, which is seldom achieved with present equipment and the control thereof.

The objective of this article is presentation of a simple, inexpensive and workable plan to improve power-factor when needed so that new and greater distances may be attained at which shovels will successfully stay on the line and carry their load.

Without delving into theory a great deal, it is well understood that the field strength of a synchronous motor controls the pull-out point and the power-factor of the motor. Generally speaking, it will be safe to believe that a majority of the synchronous-motor fields on stripping shovels are set at 80 to 100 percent of full field voltage.

By overexciting a synchronous-motor field the pull-out point is increased and the power-factor is forced toward a leading condition. These two goals are exactly those needed to let shovels operate a greater distance away from a substation, which simply means a fixed block of power transmitted further with an acceptable voltage drop.

To accomplish this overexcitation at the right time one simply needs a d.c. booster generator in series with the synchronous-motor field, as shown in the

accompanying wiring diagram. Elements in this diagram include the following:

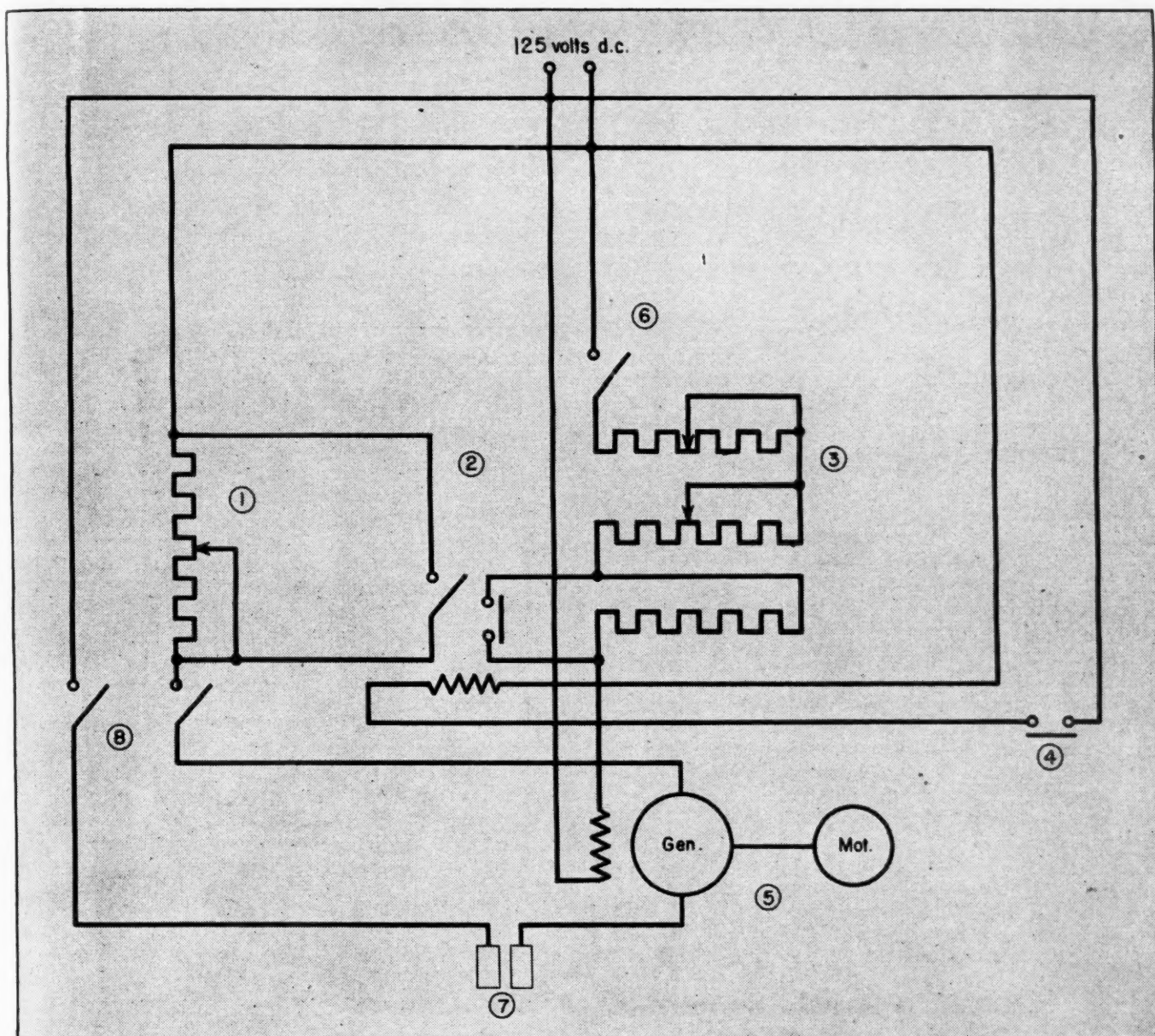
1. Synchronous-motor field resistance—usually in main m.g.-set starting panel.
2. Single-pole contactor with auxiliary contacts operated by a 125-volt d.c. coil.
3. Two adjustable rheostats and one fixed rheostat.
4. Limit switch, rope operated, to close from the hoist-motor extension shaft, hoist-motor field contactor or hoist-motor-generator field-reversing switch.
5. M.g.-set, 125-volt d.c. shunt generator, induction motor.
6. 5A snap switch.
7. Synchronous-motor collector rings.
8. Synchronous-motor field switch.

Size and description of this equipment will be dictated by each individual application; also—and this is important—the settings required.

How System Operates

The sequence of operation is as follows: the motor of the m.g. set, Item 5, is wired to start with the hoist-motor blowers, booster set, oil-pump motor or any other way that insures that it is running when the synchronous motor is started. Frequently, a magnetic starter for one of these auxiliary items is not fully loaded and consequently Item 5 can be hooked on without adding a separate magnetic starter.

With Item 5 running, the synchronous motor is started in the usual manner. Rheostat 1 is adjusted to a field current less than full field and its value will be explained later. Item 4 represents any method adopted to energize the coil of Item 2 so that this operation is performed when the dipper is going out or loading on a shovel and similarly on a dragline when the operation is hoisting. When Item 2 closes a short is placed around Item 1, giving full field to the synchronous motor. Then, too, the auxiliary contact of Item 2 closes, increasing the current in the shunt-field circuit of the booster generator. The



Set-up for a.c. line-voltage regulation by means of booster generator in synchronous-motor field controlled by load requirements

value of boost can be controlled by the rheostats, Item 3.

With the preceding equipment properly connected, the synchronous-motor field runs less than full field when the dipper is coming in and more than full field when the dipper is going out. On a dragline, more power is required from the high line when the bucket is being hoisted and swung at the same time. Thus the dragline hoist is equivalent to a shovel dipper going out as far as power requirements are concerned.

This scheme of using a weak synchronous-motor field when power requirements are low and a strong field when peak loads are encountered has a stabilizing effect on a high line. Advantages are that the line voltage is not forced up as much when a dipper causes regeneration. Neither does it pull down to undesired

values at maximum loads within limits of design, etc. This is fundamentally true because the power-factor of the system is held more nearly at unity.

Adjustments of field strength should be determined locally according to the cycle of operation and governed by the design of the synchronous motor. This scheme was used on a 1,000-hp. synchronous motor on a 32-cu.yd. shovel operating 75 miles from the power generating station. Prior to the adoption of this scheme the line voltage fell to 3,000, frequently, as might be expected, causing trouble. With this booster system the voltage was maintained at a value well within the limits considered proper for good operation.

At another property, four units operate four miles away from the substation. Copper includes three miles of 2/0 and

one mile of 1/0. Units are as follows: one 435-kva. synchronous motor on a 12½-cu.yd. shovel; one 560-kva. synchronous motor on a 10-cu.yd. dragline; one 125-hp. induction motor; and one 150-hp. induction motor—all supplied from a normal 4,160-volt line set up to give 4,400 volts at no load. The property also is served by a coal preparation plant using 700 kva. on a separate line out of the same substation. The synchronous motors would drop out of step from six to 38 times in an eight-hour shift while the tippie was running.

With the adoption of the booster scheme the synchronous motors did not go off the line or pull out of step once a week. Also, the induction motors in the tippie stay on the line and perform in accordance with the better voltage regulation.

GOOD TOWN WATER

Supplied by New Princess-Elkhorn Plant

Soft, Potable Water for Town of David, Ky., Assured by Installation of New-Type Treating Equipment—Supply Obtained From a Deep Well—Hauling From Outside Eliminated and Cost Cut Substantially

HAULING of water has been eliminated and a soft potable water supply has been assured at a material reduction in cost by the installation of water-conditioning system using ion-exchange resins at David, Ky., the site of the Princess Elkhorn No. 1 mine of the Princess Elkhorn Coal Co. Harry LaViers, Paintsville, Ky., is president of Princess Elkhorn and G. J. Stollings, Mallory, W. Va., is executive vice president.

The mine is a new operation opened in 1941. Most surface water in the region is hard and salty. Wells drilled in the area yielded brackish, undrinkable water containing 2,500 to 3,000 parts per million of total solids. Consequently, it was necessary in the early years of operation to ship the daily domestic water requirements of the 100 families in the town in big tank trucks over ten miles of mountain roads. The water was stored in a 60,000-gal. tank and fed by gravity through black iron pipes to the point of use.

Since this system involved water costs of about \$1,600 a month, other methods of obtaining potable water were investigated. The choice was the ion-exchange water-conditioning system of the American Cyanamid & Chemical Corp.—believed to be the pioneer application of such a process to the improvement of a community water supply. The

new process involves the use of American Cyanamid's "Filt-R-Stil" potable-water units and is comparable to simple cold filtration.

This unit, in operation since the first of the year, has been producing about 9,000 gal. of potable water in a nine-hour operating day. Raw water is obtained from an 8-in. cased well 400 ft. deep fitted with a 100-g.p.m. Pomona deepwell turbine pump, with the bowl 100 ft. down in the well. This pump forces the water through a 3-in. line to a 20,000-gal. tank on the hill, where it is fed by gravity pressure through a 2-in. line into the Filt-R-Stil where the solids are removed and the pure water is fed by gravity from there through a 3-in. line to a 20,000-gal. tank on the bottom of the hill. From there it is pumped to a 60,000-gal. tank on the hill where in turn it flows by gravity through a 5-in. main to the town.

Treatment effects a reduction of about 85 percent in the solids content of the water. After treatment the water averages about 400 parts of total solids per million, none of which is hardness. The dissolved solids remaining in the water give it a pleasant taste yet leave it soft and satisfactory for all domestic uses. The latest reports indicate that the chemical cost of operating the still is about \$400 a month, compared to the previous cost of \$1,600 a month when

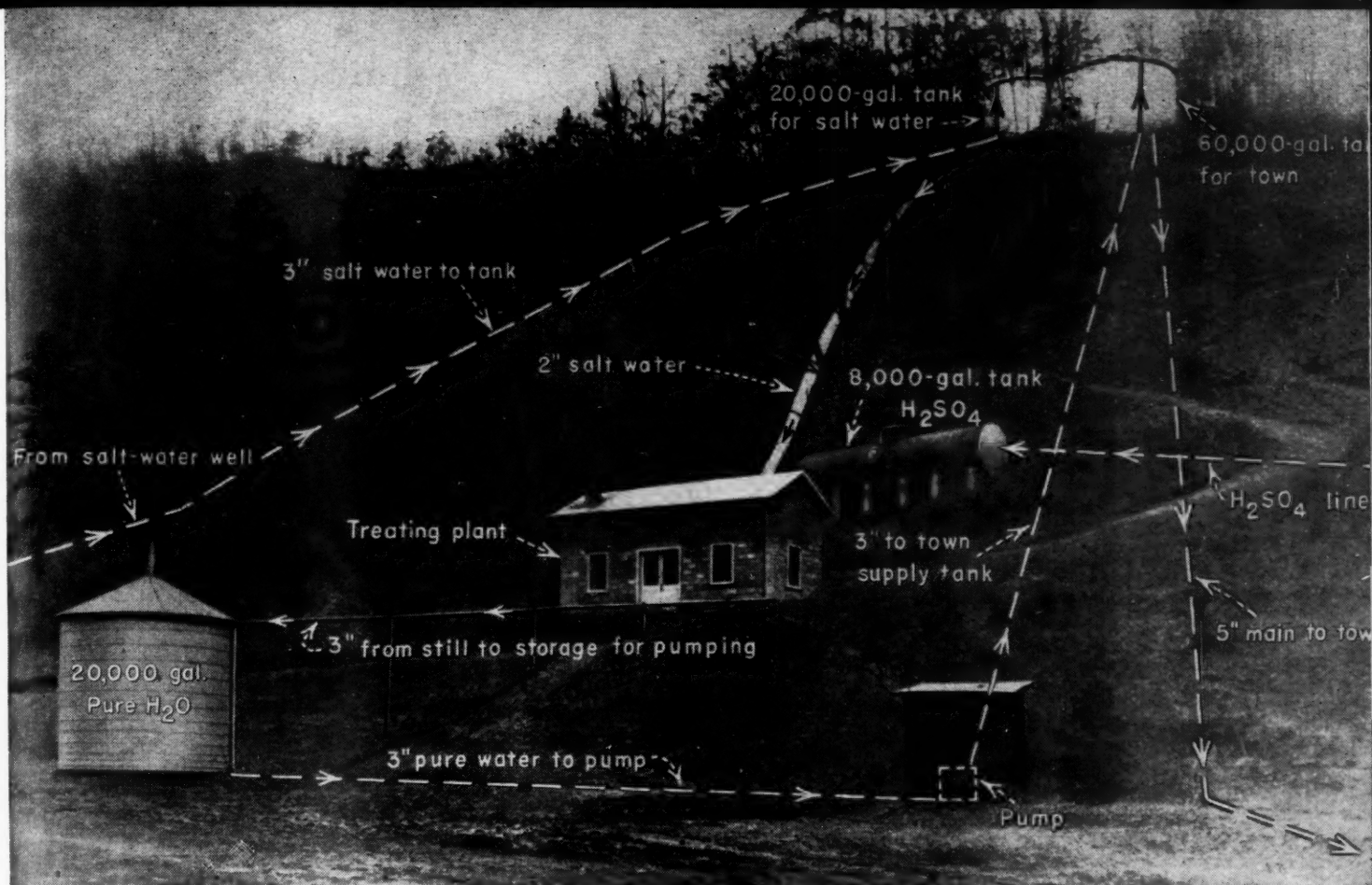
water was hauled in. Operation is a part-time job for one man and the water produced compares favorably, in quality and taste, with that provided by the conditioning plants of large cities.

The theory behind the process used in a Filt-R-Stil unit embodies what is described as one of the newest concepts in physical chemistry—ion exchange. It involves newly developed synthetic resins which have the ability to remove or exchange ions from solution. Since the hardness and saltiness of unpotable water is caused by mineral salts and acids which, in water solution, dissociate into ions, water passed through beds of these resins can be demineralized practically completely.

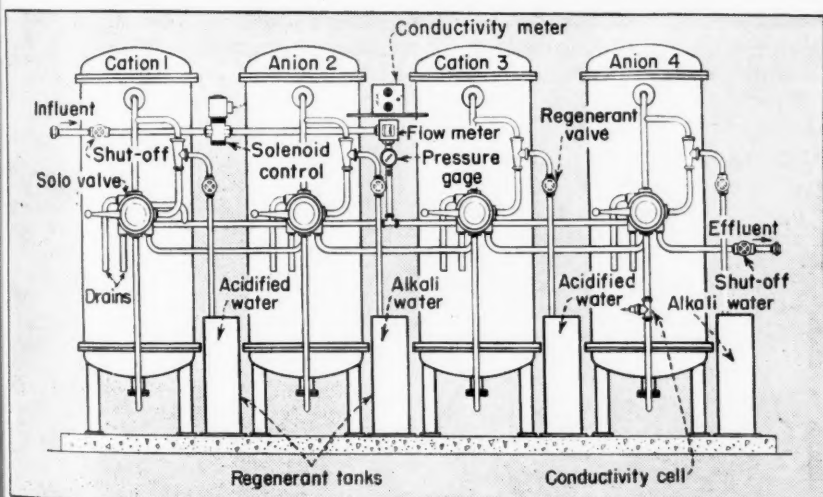
The equipment consists essentially of four columns arranged in series and containing alternate beds of cationic and anionic exchange resins. The cationic exchangers act to change salts into corresponding acids and the anionic exchangers remove the acids. Raw water is fed under pressure to the first column and thence through the series. The quality of the treated water is indicated by an electrical conductivity cell operating in the outlet from the last column. When the cell indicates that the delivered water is no longer satisfactory, the exchange capacity of the resins has been used up. The resins then are regenerated with dilute solutions of sul-

This modern community for Princess-Elkhorn miners is now supplied with soft, potable water from a new treatment plant.





After treatment in the plant shown part-way up the hill, water is stored in the tank at the top for distribution to the town by gravity.

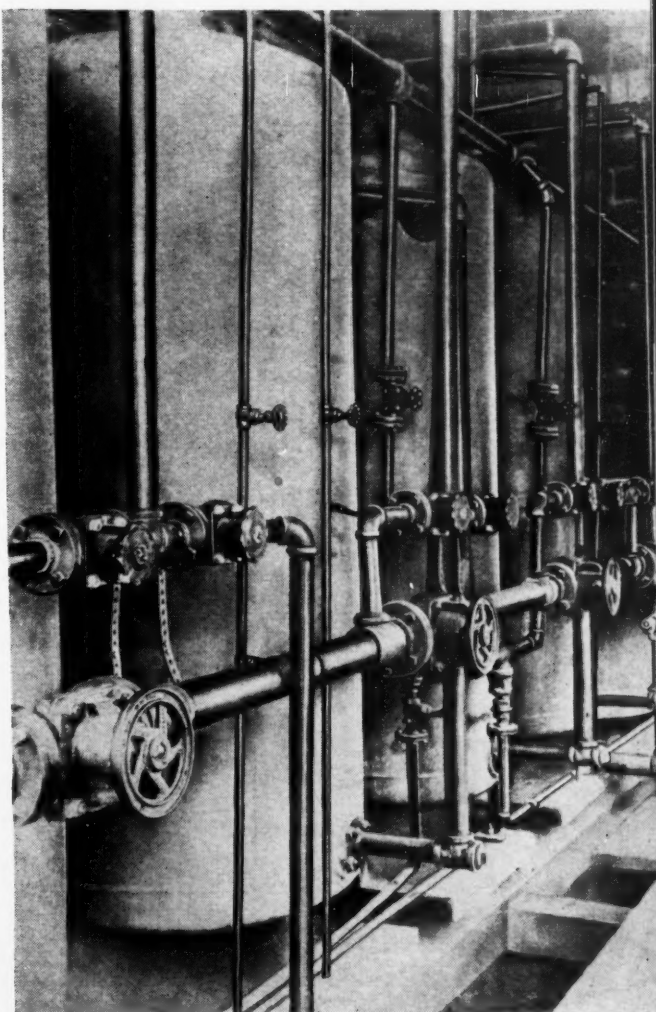


Layout of the new water-treating equipment supplying the David, Ky. community.

phuric acid and soda ash and rinsed. They are then ready for use again. This cycle can be repeated indefinitely. Consequently, the direct cost of operating the unit involves primarily the cost of the regenerant chemicals.

Although declared to be capable of completely demineralizing water, the Filt-R-Stil unit normally is regulated to reduce the dissolved solids content to a potable level only; i.e., to about 400 to 500 parts per million in most cases. Thus, the flat, uninteresting taste of distilled water is avoided.

View of the treating units in the treatment plant.



DUST ABATEMENT

By Sprinkling and Spraying in Coal Mines

Sources and Concentrations of Dust in Coal Mines—Methods of Allaying It by Sprinkling and Spraying—Pipe Systems, Tanks, Pumps, Nozzles and Other Equipment—Wetting Agents and Costs of Allaying Dust

DUST, sooner or later, is the major ingredient in most bituminous explosions. By controlling it, eliminating it and treating it so it cannot ignite, the biggest cause of fatalities in mine blasts is removed. Explosion prevention, therefore, involves some four major phases:

1. Reduction or elimination of the production of coal dust.

2. Adoption of methods of making the dust stick to larger pieces of coal and preventing its suspension in the air.

3. Adequate ventilation to dilute and carry off methane and keep the concentration of dust that does get into the air at the lowest possible figure.

4. Rendering dust on the surfaces of mine passageways inert by rock dusting so it cannot propagate any ignitions that might accidentally occur.

Topics 1 and 2 are the subject of this review of practices employed in and recommended for bituminous mines.

About 95 percent of the dust is produced at the face and, consequently,

work at this point yields the most in dividends. Sources of dust are cutting, drilling, shooting, loading, transfer, haulage, movement of men and equipment and other operations underground. Dust also is made in preparation and loading on the surface and in dumping underground. Depending on the direction of ventilation and the location of the facilities in relation to mine openings and passageways, part or all of the dust made in dumping and preparation may be carried back into the mine.

Dust control presents a different problem at each mine although the sources generally are the same. However, as stated, the critical point is at the face. Safety authorities state that concentrations of coal dust should not exceed 20 million particles per cubic foot of air during any phase of the operation. With no dust-control measures, typical counts during cutting range from 200 to 600 million particles—sometimes higher and sometimes lower. Dust from me-

chanical loading usually ranges from 70 to 400 million particles—again with figures both above and below. Electric drills make about three times more dust than hand drilling, but the drilling period is so short that the total added to the air is not great, according to students of the problem. Hand loading onto conveyors produces a typical count of 60 million particles.

Production of dust, as distinguished from allaying or controlling it after it is produced, is a function partly of the type of operation and the design of the equipment. Shearing, for example, generally produces more dust than any other cutting operation. The friability of the coal is another factor influencing dust production.

Equipment Design Involved

Prevention of dust production involves both the mine operator and the manufacturer. Equipment design is a factor in dust production. Tight cars, for example, reduce spillage and dust production. Use of bugdusters with shortwalls eliminates shoveling of cuttings and piles the dust with little disturbance, thus reducing dust production. Changes in bit lacing reduce dust production by making cutting more efficient. Sharp bits, meaning that the solid coal is broken out rather than ground off, are a material aid in reducing dust. Changes in drilling patterns and breaking mediums reduce dust production by making coal breaking more efficient and producing conditions better suited for loading.

Good conveyor construction and attention to pan and plate joints, alignment, leveling, maintenance and improvement in the construction of loading and transfer points to reduce spillage, breakage and grinding action help in the problem. Good loading of conveyors, and cars, with special attention to topping of the latter, reduces spillage and consequently dust production. Good track and smooth operation

Wetting shot-down coal and washing down the face and ribs in working sections, along with cleaning up loose coal, are dust-allaying practices followed at a number of mines with pipe systems.



of haulage equipment also are helpful, not to mention good housekeeping—keeping loose coal cleaned up and loaded out prevents it from being ground up by men and equipment, with consequent dust production.

The preceding suggestions do not, of course, exhaust the steps that may be taken to reduce the production of coal dust. As in many other coal-mining activities, attaining maximum results requires careful study of equipment and methods of operation to see where dust is being produced and what can be done to reduce the total. If production can be materially reduced, cost of measures for controlling and allaying it also may be cut.

Reduction in dust production, however, is not the whole answer to the problem, since there is little possibility with present equipment and methods of getting it down to acceptable figures. Consequently, major attention is focused on keeping it out of the air and getting it out of the mines. Use of water is the accepted method. In the United States it generally is used to wet the dust and coal as it is produced and handled and is supplemented by wetting and washing down the surfaces of faces, rooms and passageways. In other countries "infusion" also is being employed. This means forcing water into the standing coal to increase its moisture content and thus prevent dust being thrown into the air in subsequent operations.

Water Infusion Tested

Work abroad includes experiments in Australia, starting in 1944, to abate dust by water infusion at low pressure by means of holes drilled in pillars. According to a recent report by R. P. Jack, production manager for the Australian Commonwealth Coal Commissioner, on work at the Coal Cliff Colliery in New South Wales, hole diameters were 1½, 2½ and 2¾ in. The tentative conclusion was that absorption was greater from the larger holes. Using pressures of 35 to 40 lb. per square inch, it was found, according to Mr. Jack's report, that the water, within 48 hours, saturated the coal for 12½ to 15 yd. on either side along the entire length of the holes. The treatment remains effective for "at least eight months." Tests also showed that ideal conditions were attained with the use of about 1½ gal. of water per cubic yard of coal, larger quantities making the coal too moist.

The work was done, as noted, in a pillar area. Experimental long holes bored in solid work produced negative results, since the coal would not take any appreciable quantity of water even at pressures up to 200 lb. per square inch.



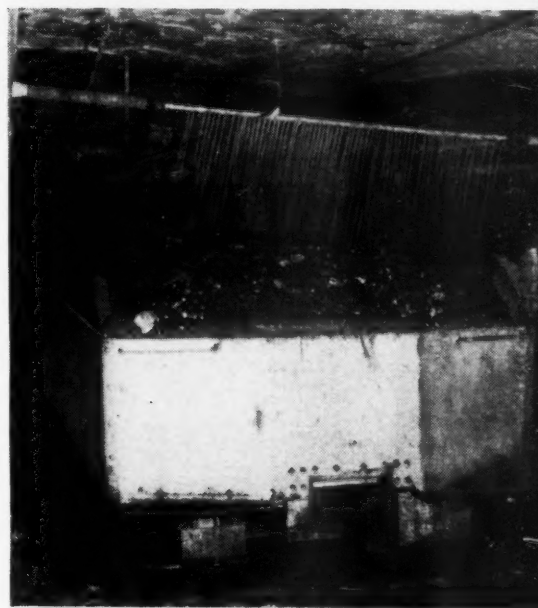
Dust in dumping and preparation is kept down by such methods as spraying loaded trips in transit or empty cars on the way in. A solenoid-operated valve turns this spray off and on automatically to conserve water.

Shorter holes 15 ft. deep were tried with somewhat better—although not conclusive—results. In concluding his comments on infusion in solid coal Mr. Jack declared that "the reaction of the coal to infusion in the same seam not only varies at adjacent collieries but in different places in the same section of one mine." However, reports on infusion in solid coal in other countries, especially Great Britain, can be summarized as indicating its feasibility with short holes and high pressures, with some successes also at low pressures. Character of the coal, including cleavage, bedding planes and porosity, apparently is a major factor in how well it will accept water.

Infusion, especially in solid work, necessarily involves keeping the place idle until the water can be introduced and permeate the coal for the necessary length of time. For that reason its application in highly mechanized work would be attended with some difficulties in this country, leading to the conclusion that emphasis for the present, at least, will be on other methods of allaying dust. These, it might be said, do the job when properly carried out.

Methods of Wetting

Wetting with water from a hose is one widely used method of killing dust. Sprays, mists and fogs are the second and growing method for perhaps two reasons: (1) quantity of water is reduced; (2) the fine spray, mist or fog does a better job of wetting and knocking down dust than a solid stream of water. Pressure sprays, mists and fogs, according to available data, can reduce dust in the air as much as 90 percent at a cost of ½ to 2c. per ton—perhaps more in some cases. Wetting agents added to the water are discounted by some operators but the majority are of the opinion



Wetting down empty and loaded trips prevents production of dust during haulage.

that they increase the effectiveness of wetting and consequently reduce the quantity necessary. Cost of wetting agents, reports indicate, ranges from one-tenth of a cent per ton up to two-tenths or so, while the quantity of water necessary is cut up to 75 percent for desired dust reductions.

A water supply is the first requisite, plus a distribution system, including part or all of the following: pressure pumps, pipe, tanks, valves, strainers and nozzles. Water supply and distribution represents the bulk of the expense and the various systems, therefore, deserve careful study. The number of dust sources requiring treatment and the degree of dust reduction necessary are prime considerations.

Water may be obtained from surface sources (streams, lakes, ponds, reser-

voirs, water mains and tanks), water-bearing strata, water standing in drill-holes, mine drainage, old workings, underground sumps and dams, tanks and combinations of two or more. Where surface storage is available, through boreholes or otherwise, the head made available is advantageous because it may reduce or eliminate the need for pumping. Approximate pressure in pounds per square inch may be determined by multiplying head in feet by 0.434. Multiplying pounds pressure by 2.3 gives the approximate head in feet. If mine water requires pumping underground, it frequently may be feasible and more economical to make use of these pumping facilities. If water can

be obtained from large sumps or sealed areas, it usually will be alkaline as a result of standing. Acid surface and other supplies may, in some instances, be treated with limestone, lime or soda ash.

Water Distribution

Distribution of water may be by pipeline, tank cars (track or tractor mounted), tank trailers, tanks integral with the mining equipment, portable tanks and combinations of the several. With pipe throughout the mine and water supply from a central source, the main pipelines generally are 4-in.; secondary, 2- to 3-in.; working area, $\frac{3}{4}$ - to 1-

in. Galvanizing reduces corrosion and three-ply pressure hose is recommended because its toughness insures longer service.

Pipe and hose should not be smaller than $\frac{3}{4}$ in. in diameter to minimize friction loss. One company limits distribution with 2-in. pipe to 1,000 ft. and with 1-in. pipe to 500 ft. to minimize friction loss. Discharge in gallons per minute equals 0.0408 times the diameter squared times velocity in feet per minute. Pipe diameter in inches equals 4.95 times the square root of the quotient obtained by dividing gallons per minute by the velocity in feet per minute.

Hose connections of the compressed-air type requiring only a quarter turn and the hydraulic type requiring push or pull for coupling or uncoupling are most desirable. Valves, preferably the cut-off type operated by a lever moved 90 deg., should be installed at the end of pipelines to control water and also outby at branch connections for extending pipelines readily. In addition, they are needed at auxiliary spray points that are not at the ends of pipelines.

Although pipelines throughout the mine have been common practice when all dust sources are treated with water, there are many other practical and perhaps more economical methods of distribution. Water may be pumped to the faces through pipe laid from conveniently located dams, sumps, drill-holes and track-mounted tank cars.

Tank Cars and Trailers

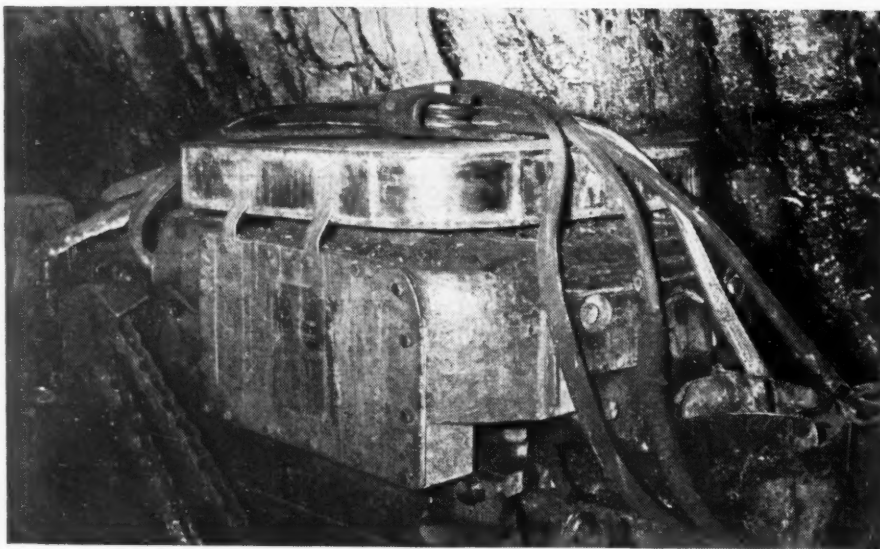
Tank cars may be set in crosscuts in the working sections and pipe or hose laid to the faces, barrels for filling cutter tanks and the like. Capacity should take care of the needs of the section for a shift. Some have been built with a capacity of 1,000 gal. The tanks also may be employed as fire-fighting equipment by adding the necessary fittings.

Tank trailers eliminate the need for pipe to the face if only treating during cutting is necessary. They usually are hauled by the mining machines and capacities usually are 1,000 to 1,500 gal. One consideration is the capacity of the machine tramming motors to handle them when steep grades are encountered. Also, maneuverability may be affected on sharp curves.

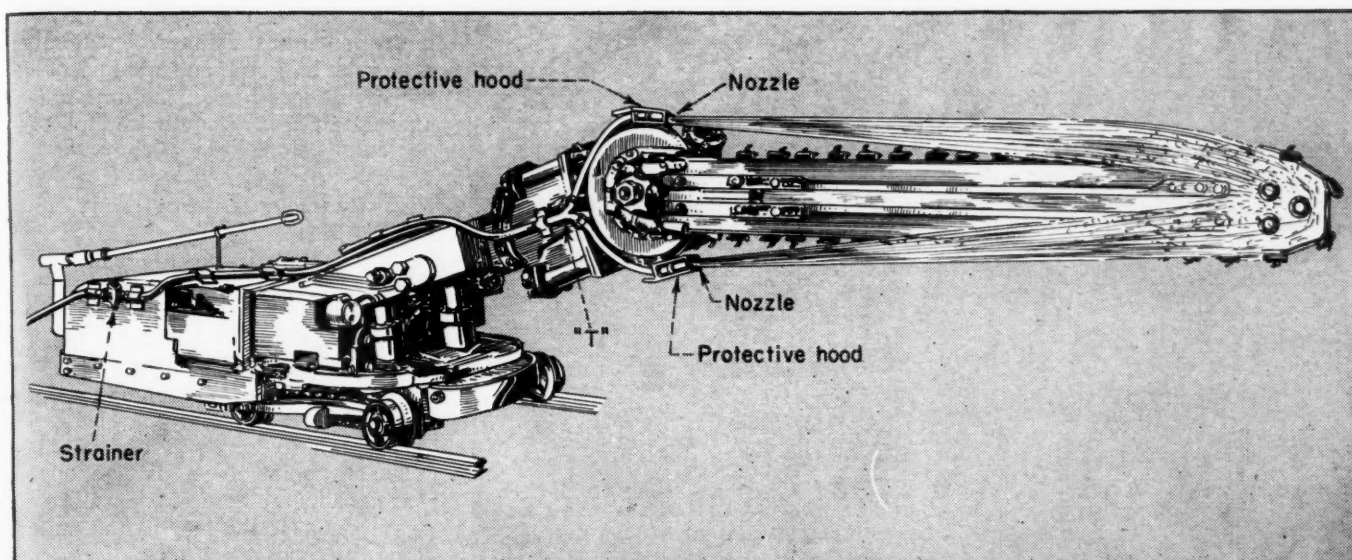
Tanks integral with the mining equipment overcome many handicaps of trailers. They generally have a capacity of from 200 to 300 gal. and are included by the manufacturer on many new types of mining equipment. Some trackless mines employ portable 6-gal. tanks made from light-weight boiler tubing. They are filled with liquid, air pressure is added and then they are hauled to the face for use.



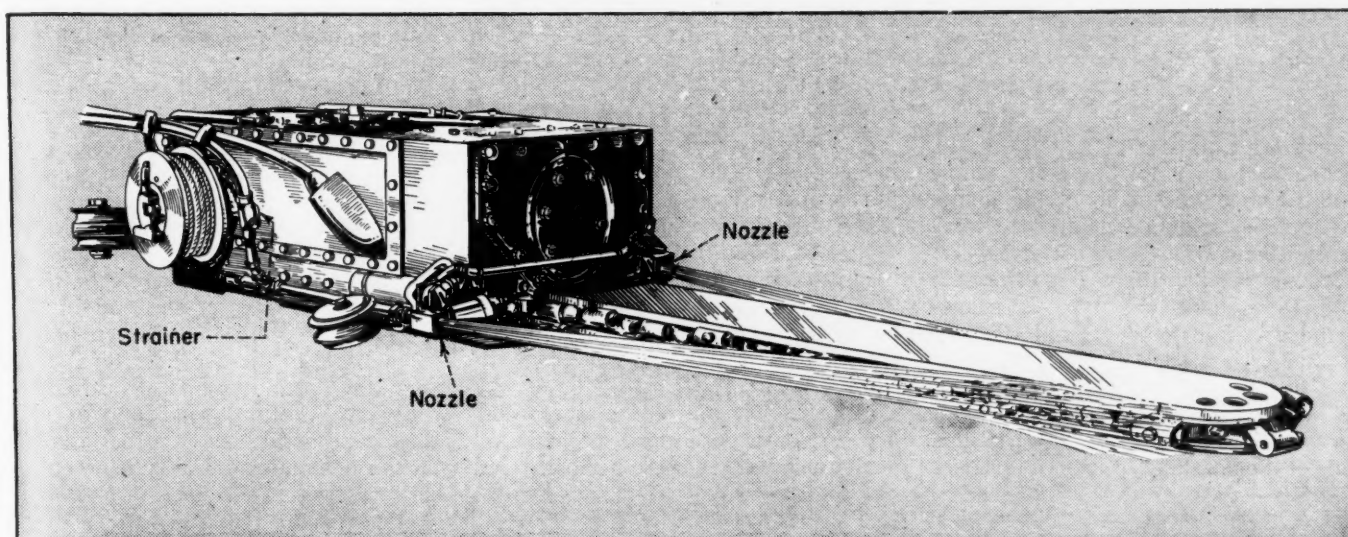
Tank trailers are used by many operators to supply water for cutting with both track-mounted and shortwall machines.



Tank on shortwall holds water enough for one cut. It feeds onto the chain by gravity. Some operators install tanks with pressure pumps between the wheels on shortwall trucks and on the tops of track cutters.



One method of using sprays on the bar of a track cutter (from U. S. Bureau of Mines illustration).



Spray arrangement—one of several—for use on shortwall cutters. Although not shown, the pipe across the front of the machine should be protected by a guard.

Fine sprays or mists apparently allay dust most effectively and, therefore, the water or wetting solution should be under pressure. Pressures from 60 to 125 lb. per square inch are desirable and 65 to 75 lb. generally is employed at the spray point. To obtain these pressures a pump usually is employed. In selecting a pump the type and capacity of nozzles (differing with water and wetting agent) and pressure desired should be determined beforehand. The pump should deliver gallonage at an effective pressure greater than required by the total number of discharge points it serves. The suction lift, discharge head and friction losses in suction and discharge pipes and strainers must be considered. To conserve liquid sprays should be controlled to operate only when the dust source is active. A bypass and pressure-relief valve should be provided to return water to the tank

when the sprays are shut off. Motors should be of the permissible type.

Turbine-type pumps meet the requirements very well and are employed almost exclusively on tanks, individual machines and underground localized water-supply systems. They normally are mounted on the machine or tank. However, one company is known to employ the pump independently of the tank car to avoid hauling it around. The turbine-type pump will develop pressures up to 175 lb. per square inch in a single stage and occupies less space than other types with a similar performance. They readily give 1 to 5 g.p.m. at 75 lb. per square inch with a 2-hp. 1,750 r.p.m. motor. Centrifugal-type pumps generally are employed for main central supply systems and plunger types are applicable.

Liquid under pressure requires a nozzle of some type to break the wetting

stream into fine particles and allay the dust effectively. The most commonly employed sprays are the flat-sheet (finely divided drops of liquid spread out at wide angle with relatively little thickness), solid-cone (liquid ejected as a cone and the whole area filled with drops), narrow-angle solid-cone (liquid ejected as a solid cone about 18 in. in diameter 10 ft. from the nozzle) and hollow-cone (liquid ejected in an annular pattern with the center of cone hollow and containing few drops). The flat-sheet and narrow-angle solid-cone types generally are considered the best types. Dust in suspension is best controlled with flat-sheet sprays. The narrow-angle solid-cone type is particularly desirable on cutter bars.

Nozzle orifice generally is 0.0625 (1/16) in. but may be smaller or larger depending upon the installation. A nozzle with a 1/16-in. opening will deliver



A nozzle on a stand connected with the piping system by a hose directs a jet of water at the hole and reduces dust during drilling.

about 1 g.p.m. at a pressure of 75 lb. per square inch and with a $\frac{1}{8}$ -in. opening and the same pressure about 4.05 g.p.m. A nozzle is seldom employed to spray more than 2.5 g.p.m. Strainers are necessary to prevent clogging of nozzles and the self-cleaning type is recommended as both practical and efficient. A strainer is needed at the spray point and also at the intake side of pumps to reduce wear from impurities and for additional protection against clogging of the nozzles. A gauze-wire strainer

also may be employed at the filling point of tanks to keep out foreign matter. Some line strainers cause a 5-lb.-per-square-inch pressure drop.

Some operators have used sprays made of grease cups drilled with four holes. Another reports that the best results have been attained with pressure-type grease fittings with the "innards" removed.

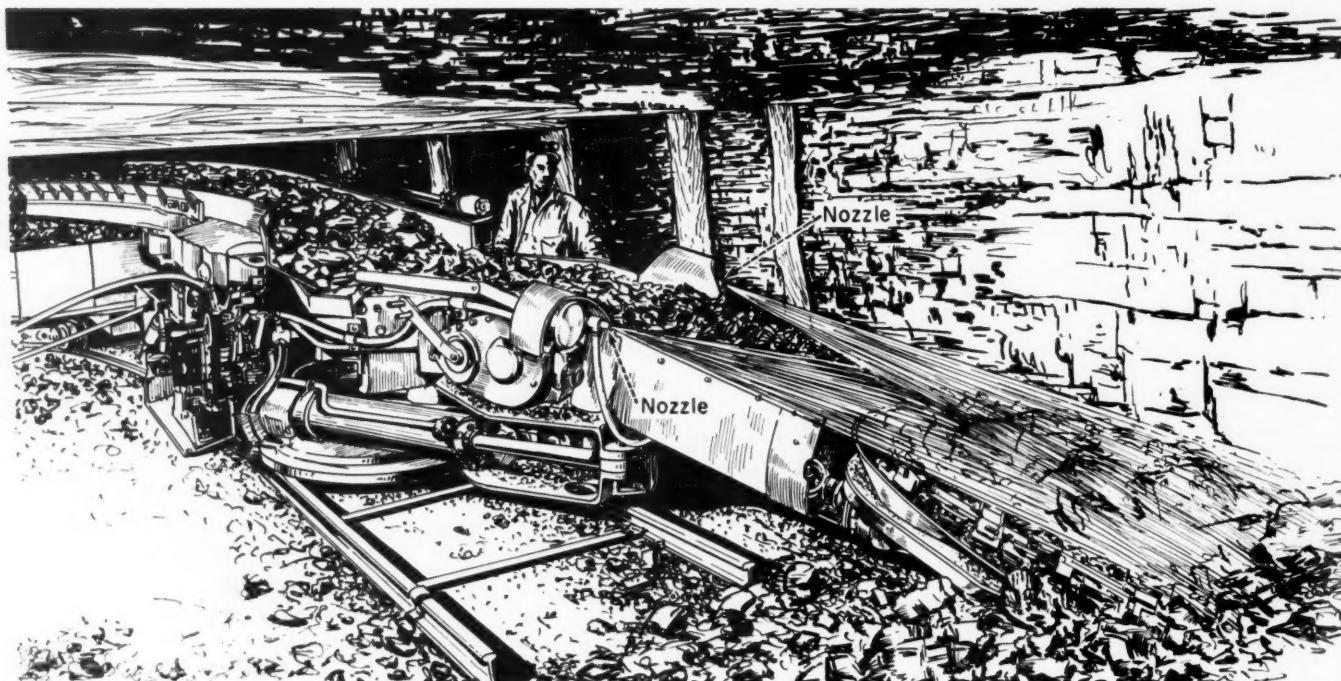
For effective control, the spray installation at each dust source normally includes nozzles, $\frac{3}{4}$ -in. pipe or hose, valve,

strainer hose connection and adequate protection against damage. The number of nozzles and type and method of installation depend upon the dust source under attack, and require careful consideration before installation.

Reducing Cutting Dust

Undercutting, as stated, usually is the greatest producer of dust. Fundamentally, best results are attained by using a jet or spray on the ingoing chain. In a number of cases a permanent pipe or jet is mounted on the machine to direct a stream of water into the chain. In others, a hose simply is clipped in a holder to point down on the chain. Occasionally, the hose nozzle is directed at the chain at the rear of the cutter. Other methods that have been employed to get water into the cut include clamping or welding a pipe in the channel in the center of the bar, with an outlet upward or sideways through the bar at the inby end. In some instances side holes are drilled the entire length of the bar.

The present tendency, however, is to fit shortwall bars with higher-pressure spray or mist nozzles. The number varies from one to three. A narrow-angle solid-cone nozzle may be installed on the front of the machine to spray the ingoing bits near the end of the cutter bar. A second similar nozzle (sometimes of the flat-sheet type) may spray the outcoming bits. In extremely dusty coal a third solid-cone or flat-sheet type nozzle may also be installed on the outcoming side. When wetting



Showing use of two spray nozzles on a loading machine (from U. S. Bureau of Mines illustration).

agents are employed the third nozzle may not be required. Some mines employ one nozzle and spray only the ingoing bits. Top cutting and shearing machines employ sprays similar to undercutters. However, as shearing is the greatest dust offender, additional flat-sheet or solid-cone type nozzles may be necessary to spray the outcoming bits.

Spray Nozzles for Loaders

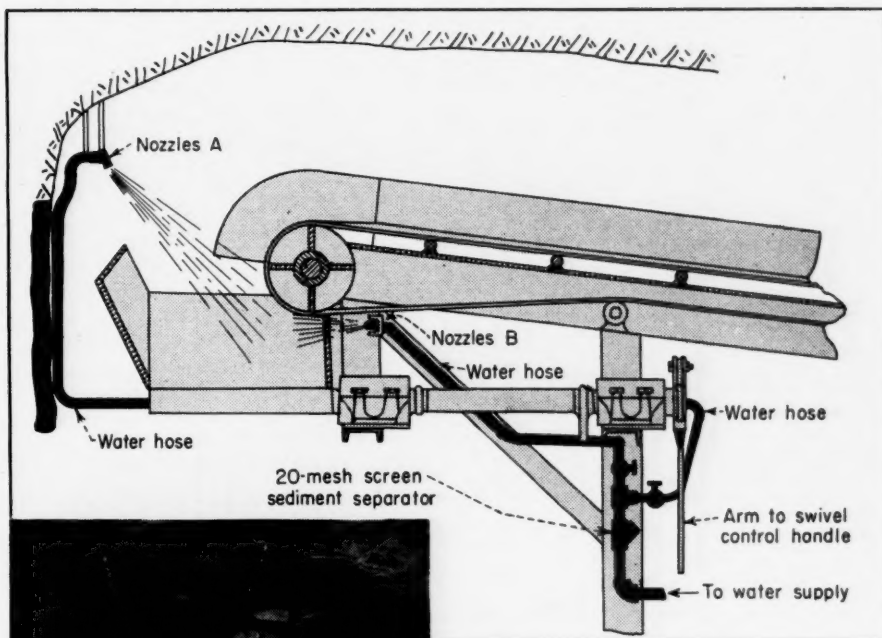
Mechanical loading creates dust that may be allayed by spraying the face and coal pile prior to and during loading. Loaders may be equipped with spray nozzles, usually one on each side near the headlamps. On some machines, some feel it may be better to place the second nozzle farther back from the front end. Loaders with a hopper may employ additional sprays at that point. Nozzles normally are solid-cone units, although flat-sheet and combinations of each type may be employed. The necessity for and volume of spraying required during loading is dependent upon many factors, including character of seam, type of mining and efficiency of previous wetting.

Drilling makes dust that may be controlled by wetting the face before and spraying the hole during the operation. Blasting may produce dust that can be controlled effectively by spraying the face, ribs, roof and floor prior to and after each shot. Repeated application of water may remove smoke and dust from the air in about 1½ min. The dust from blasting and subsequent operations may be greatly lessened by wet cutting and the complete removal of cuttings before blasting.

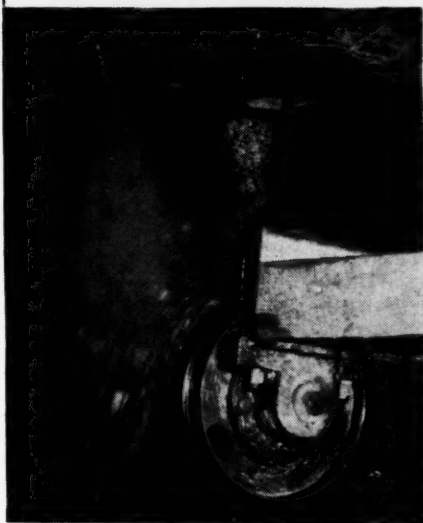
Conveyor Methods

Hand-loading onto conveyors produces dust that may be allayed by wetting the coal pile before and during loading. Very little wetting, if any, may be required if wet cutting is practiced, especially if wetting agents are employed. Conveyors usually do not add greatly to fresh-dust production but their operation may cause previously made dust to become airborne. Therefore, sprays should be placed along them as needed and especially at discharge and transfer points. Dust that adheres to the carrying surface of belt conveyors is released after the coal is discharged when the belt contacts the supporting rollers. A spray cleaner, as shown in an accompanying illustration, is one answer. All dust and coal spillage should be shoveled out after each shift.

Shuttle cars grind road coal during haulage and throw dust into the air. Under similar mining conditions, the rib dust in shuttle-car sections may be



One method suggested by the U. S. Bureau of Mines of using a spray under the belt head to supplement the overhead spray.



A method of reducing dust frequently used at conveyor and elevator discharges—a fog nozzle above the end of the unit.

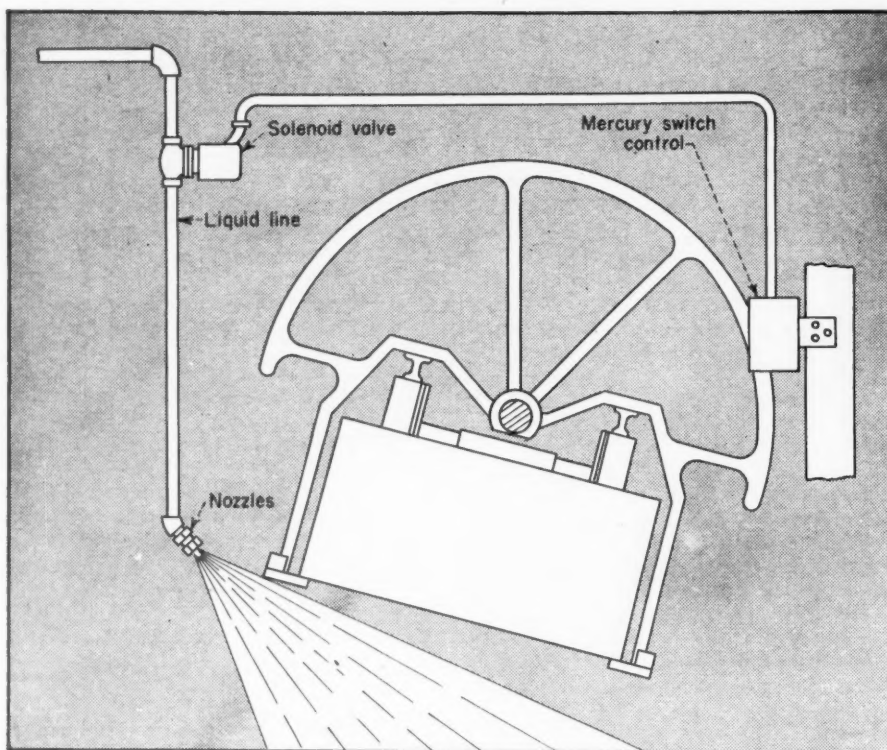
twice as much as in track sections. Scraping coal off the bottom and exposing incombustible matter usually does not render the dust nonexplosive regardless of visual observation. Efficient wetting at the face is stated by safety authorities to be the best method of reducing the dust hazard in these sections. Spillage should be avoided and may be minimized by careful loading. Additional control measures are: loading out cuttings before blasting, loading out bottom coal and dust left by the loading machine before the coal face is again cut, sprinkling the haulage road periodically, employing wetting agents and salts for settling road-bed dust, employing sprays at car-loading elevators, hand loading out all coal spillage and rock dusting at short intervals.

Tipple and cleaning plant dust clouds may be avoided by a few precautionary measures, and results are especially easy to obtain when there has been effective dust control underground. Liquid containing a penetrating type wetting agent is suggested. Dumps and chutes may be enclosed and sprays placed strategically in them. One method is to install flat-

sheet sprays around the perimeter and a solid-cone spray in each corner, as well as several feet higher, in the dump or chute. Sprays are employed in rotary dumps in essentially the same manner but their installation is a special problem in each case. Vertical solid-cone and flat-sheet type sprays may be employed at the end of chutes, shakers and conveyors. Spray operation should be controlled by solenoid or some other suitable switch to save solution.

The use of wetting agents, previously referred to, is a major development in dust control. These agents consist of chemicals that are added to water to increase its dust-allaying effectiveness by reducing surface tension of the water and consequently interfacial tension between the solution and small particles of coal. This enables the solution to wet and trap smaller particles of coal faster than plain water and, therefore, keeps dust down. At least one operator also has found the use of two parts of soluble oil to 100 parts of water effective in increasing dust-allaying effect.

The wetting agent may be added at the water supply source or, if the agent



Spray arrangement suggested by the U. S. Bureau of Mines to kill dust in a rotary dump.

is in liquid form, by automatic addition from proportioning feeders placed in the water supply line. One feeder strong enough for mine work is the hydraulic proportioning eductor. The flow of water through a nozzle and venturi section creates suction and draws the wetting agent from a pipe extending to the wetting-agent container. This feeder is effective where discharge of solution is constant, as on individual equipment, tank filling and in tipples. A good wetting agent should readily mix with water, be active over a wide temperature range, have a low freezing point and at the same time be non-corrosive, non-inflammable, non-clouding, non-toxic and odorless.

Flaked calcium chloride and unrefined granular sodium chloride effectively allay dust on roadways, particularly shuttle-car, in normally humid mines. In addition, when properly applied and maintained loose road material becomes thoroughly consolidated and forms a good pavement. No recordable change or variation in relative humidity takes place. Rock dusting has little effect on absorption of moisture if the salts are applied in sufficient quantities. Salts applied at 0.06 lb. per square foot of roadway have produced good results.

A study of the effect, efficiency and costs of spraying have resulted in the accumulation of various pertinent data, including the following: spraying during undercutting normally requires about

1½ gal. of water per ton of cuttings and increases their moisture content about 1 percent, which is not detrimental to marketing or handling minus ¾-in. coal. Solutions containing wetting agents are even more effective as evidenced in one case where spraying during operation of a shortwall gave a 60 percent reduction in dust with 40 percent less water than with water alone. In another case its application during operation of a track-mounted machine resulted in a 66-percent reduction in dust with 50 percent less water.

Wetting Agents Effective

A report of the Coal Division of the American Mining Congress showed dust concentrations of 338.0 million particles per cubic foot during cutting and 176.0 million during loading without water. Using plain water at a rate of 0.30 gal. per ton, the dust count during cutting was 46.9 million and during loading 68 million. With no change in quantity but with one wetting agent used at a rate of 0.001 lb. at a cost of 0.16c per ton of coal, dust counts were 24.5 million during cutting and 34.7 million during loading. Using another wetting agent at a rate of 0.008 lb. and at a cost of 0.10c. per ton (still 0.30 gal. of solution per ton), the dust count was cut to 13.0 million during cutting and 14.6 during loading.

Other reports deal with such installations as one employing a wetting agent

solution and two nozzles with 0.062-in. orifices spraying 0.72 g.p.m. at a 75-lb. per square inch pressure. Four sprays, two on the cutting machine and two on the loader, consumed about 700 gal. per shift. In another example, the use of effective sprays during undercutting resulted in a dust reduction of about 85 percent at the face. After four weeks of spraying at the face there was a 67-percent dust reduction in the section of mine concerned, indicating that dust from other sources in a mine is materially affected by wetting during the cutting operation.

Spraying Costs Vary

The total costs of spraying differ considerably at different mines, but available operating reports indicate that operating expenses normally are ½ to ¾c. per ton, with variations both above and below. The results of one study show a spraying cost (including construction, installation, operation and depreciation), with a pipeline from a dam supplied by water car, of 1½c. per ton, compared to ¾c. per ton with a trailer tank-truck supplied by a water car. These costs include 0.17c. for wetting-agent treatment.

In mechanized mining the dust problem is greatly increased by the operation of equipment and the rapid rates of advance. Liberation of gas also is more rapid and ignition sources more numerous. In addition to the explosion hazard, clouds of dust decrease visibility and result in poorer working conditions. Effective control measures reduce these dangers, increase efficiency of the miners and promote better employer-employee relationships.

None of the dust-allaying measures eliminate the necessity for rock dusting and maintaining anti-explosion barriers. However, efficient dust control may reduce the frequency of rock dusting. In one case, after spraying at the face of the butt-entry, rock dusting was reduced from once a week to once every four weeks while maintaining the same incombustible content. Gob areas and old workings should always be rock dusted and it may be desirable also to employ wetting agents and salts.

One of the major advantages of the use of water to allay dust set out in Bureau of Mines publications and elsewhere is the fact that it backs up rock dusting. Dry coal dust, even with a high rock-dust content, can ignite and propagate an explosion. If it is damp, it cannot be ignited. For that reason, the Bureau and other safety men stress the necessity of keeping the entire mine moist—not necessarily sopping—but damp enough to forestall the ignition hazard.

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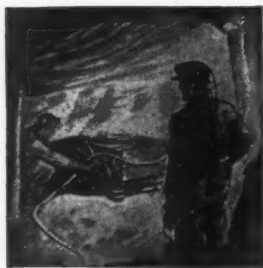
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COAL AGE • June, 1946



SAFE POWER





The Foremen's Forum

One Reason Why Pillars Pass Air Into Goafs and Returns

Roof Is Not a Rigid Body but Bends Down into Excavated Areas, Arching Up Over Spaces Not Thus Excavated—These Arches Crush Goafside Ribs and Leave Thin Spaces Where Air Can Vault Pillars

WHEN THE ROOF within a goaf sags, as is shown in the accompanying illustration, it must needs rise over "pillar systems." This rise in the sketch, of course, is greatly exaggerated. (A "pillar system" may be defined, at least for the purpose of this article, as the pillars lying between two goafs and including the space occupied by the headings and crosscuts of an entry. In the case of a room entry, it also includes the pillar which is left adjacent to the haulageway or haulageways of that

entry, after the pillars of the rooms have been drawn).

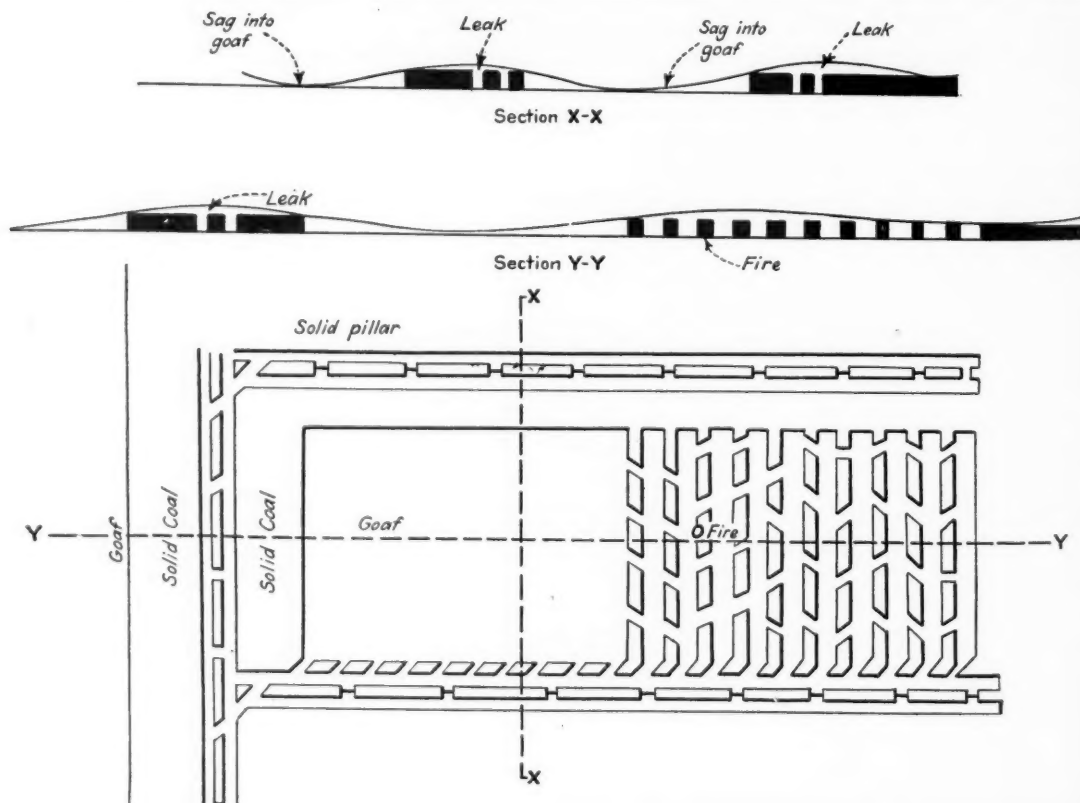
Pillars Crushed at Edges—At the edge of each pillar system this roof sag theoretically makes only a point or line contact. Actually, however, the pillar system is crushed at its top edges along the exterior lines to such an extent that the contact is over a fairly wide surface, which usually is overstressed and may be even broken by the pressure. Through this zone of destructive compression, air under a difference

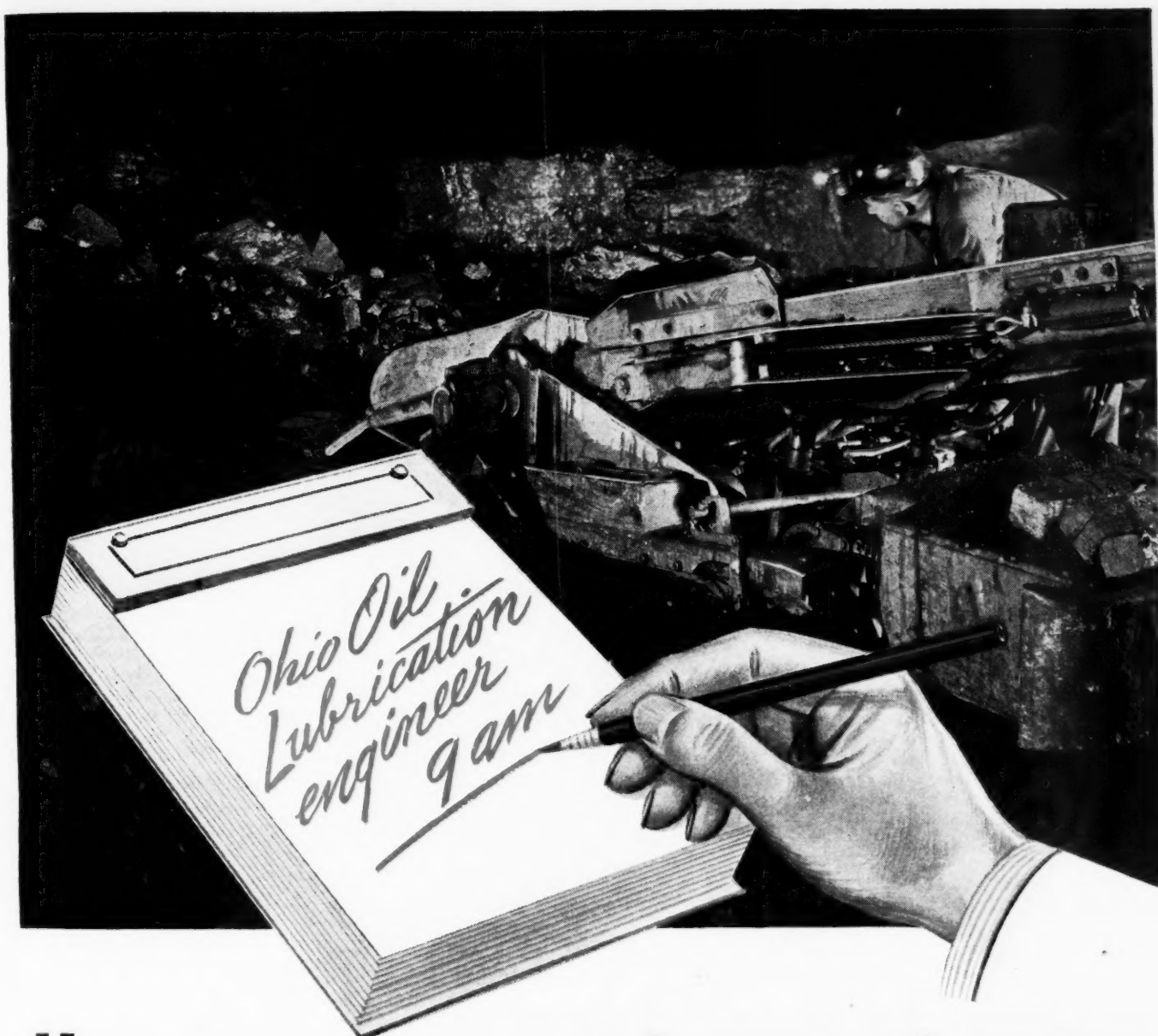
of pressure can readily leak. Thus strain from vertical stress at the edge of the pillar system and absence of vertical stress back of that edge combine to provide an inlet for air from entry heading to edge of goaf.

Over the interior openings (the headings) of a pillar system, the roof humps, or saddles, so that the air passes more readily from heading to heading than it would before mining made the roof sag and saddle. Similarly, in any sequence of rooms in a panel, the main weight falls on the pillar nearest the goaf and is relieved thereby over the other pillars; thus the air could pass without difficulty from room to room, though here the air-pressure differences are so small that such movement is slight and in any event entirely without significance, even in case of a mine fire. It provides opportunity, however, for methane and carbon dioxide to escape from the heart of the pillar by passing over, instead of through it.

Effect on Mine Fire Fighting—Where the fire is in the middle of a panel, as shown in the illustration, the bending of

When the roof sags and saddles, it crushes the edges of pillar systems and allows air to travel over the pillars from heading to heading, from heading to goaf and from room to room. This illustration greatly exaggerates this action.





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the roof over the pillars of the remoter entry systems surrounding it is not so harmful as is the bending of the roof over the pillars of the nearest entry systems, though in the sketch the saddle had to be shown as high as where the pillars were more distant and extraction more complete; otherwise the saddle and the sag would have been less readily noted.

If combustible gases, combustion-sustaining gases or gases of unknown analysis are doomed to enter into a fire area, it is best to have them enter at points remote from the fire itself, because at such points it may destroy the vacuum without reaching and revitalizing the fire with its oxygen. Thus, this characteristic difference in roof flexure and consequent leakage may prevent fatal results. Leakage at a remote point is certainly more desirable than it would be near the fire.

Headings Under Same Saddle—A disadvantage is the loss of air between intakes and returns, both headings, with the pillar between them, being under the same roof saddle. Another disadvantage is the fact that the sagging of the roof causes it to move relative to the floor and, as the posts in rooms or longwall workings move with the roof, they tend to get loose and escape from their cap pieces and wedges. However important that may be in heavily pitching beds, in level coal beds posts usually continue to stand, even after the cap pieces and wedges which formerly held them have fallen.

Where Air May Be Lost

The only cure for the first disadvantage, loss of air between intakes and return, is to have one-way ventilation, which cannot always be arranged, or to return the air through the goaf. This arching of the roof is one reason why, in even the best regulated mines, as much as 15 percent of the air supplied fails to reach the working faces. There are several other reasons for the loss of air, however; among them imperfect stoppings, overcasts, brattices and doors, shattered coal from blasting, open doors, outcrop and shaft air losses and leakage through pillars, roof, and fractured mine floors.

Spraying Will Decrease Leakage—Where to increase the height of the roadways, the roof is breached by explosives or in some other way, the guniting or painting of the roof above the level of the top of the coal, and for a short distance below that level will reduce this leakage. This is an incidental reason for preserving the roof by spraying, which reason thus far has never been considered.

In all fully excavated room panels, the stresses on the pillar system that supports the entry occur near the goafside ribs. The ribs of the headings are exposed to little stress, for the stiffness and strength of the roof saddles protect the ribs from this pressure only to lay a heavier burden on the immediate peripheries of the goafs, which peripheries where coal heats spontaneously are often the seat of mysterious mine fires, which in Europe have often been charged, probably with reason, to excessive roof pressure.

Overlooking a Spring He Missed a Dip

A coal mine had been running so many years it was almost exhausted, so the management decided to open a new mine. The old tippie would serve for the new workings, and a prospect hole had revealed the seam to be of workable thickness and quality at the point of a hill where a ravine opened into the main valley. The coal at this point could be reached from the tail track of the tippie by a half-mile track on a 2-percent gradient, up which, without too much expenditure of effort, the empty cars could be pulled by an electric locomotive.

What He Overlooked

The superintendent thought he had enough facts to justify building the track and opening the mine, but he had overlooked a very active spring that ran copiously the year round, crossing the projected track at a point about half way to the ravine. The spring made hardly any dent in the contours, as the water stayed underground until it reached the point where the coal outcropped. The superintendent surely should have suspected that the coal seam formed a basin at that spring. If he had prospected for the coal there, he would have found that at that point it was perhaps 20 ft. lower than the coal at the prospect hole in the ravine. An opening also at the spring could have been reached from the tail track of the tippie with a 2-percent gradient.

The mine was opened, however, near the point of the hill, and a face heading was driven back on a dip of about 3 percent toward the spring. The measures were quite wet, so the superintendent had much trouble both with drainage and haulage. Eventually, he cut off the basin by constructing a road through rooms at 45 deg. to

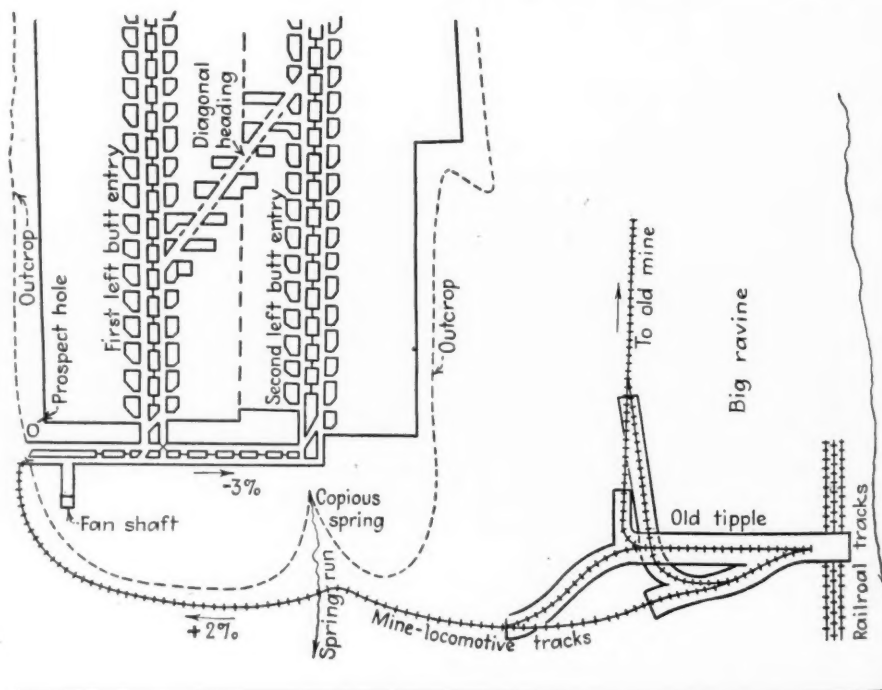
the First Left Butt Entry and obtained a good gradient to the Second Left Butt Entry, for the coal rose on a fair inclination from the basin in the direction in which the room headings were oriented.

But he had missed his opportunity. The ground at the spring was just a "natural" for the opening of a mine, but he had bungled the matter and never was willing to admit that fact or to open up the coal at the spring even to drain the dip, and for two years he had plenty of trouble.

Moral—Never fail to open enough outcrop holes to know your seam and especially never overlook a spring. It is Nature's way of designating a dip, even if the source of water is not so remote that the spring has developed into a full-sized ravine.

Why Dampen Coal Dust

Coal dust should be sprayed and dampened: (1) Because during blasting and the operation of equipment it can cause and propagate a disastrous explosion. (2) Because large quantities of the dust will irritate the respiratory organs, making them subject to infection and, thus tuberculosis may be developed. (3) Because the dust will block the respiratory organs and make them ineffective and so less able to perform their function of oxygenating the hemoglobin of the blood. Dust-laden lungs function with difficulty and deprive those who have to breathe with them of the vigor and contentment natural to those breathing air not so polluted. This is a progressive condition, becoming more and more severe as the years pass. (4) Because the dust obscures light and so causes accidents, preventing the workers from seeing clearly (a) the condition of coal face and roof and (b) the movement of trucks, cars, machines and their parts, especially with oblique, or indirect, vision.



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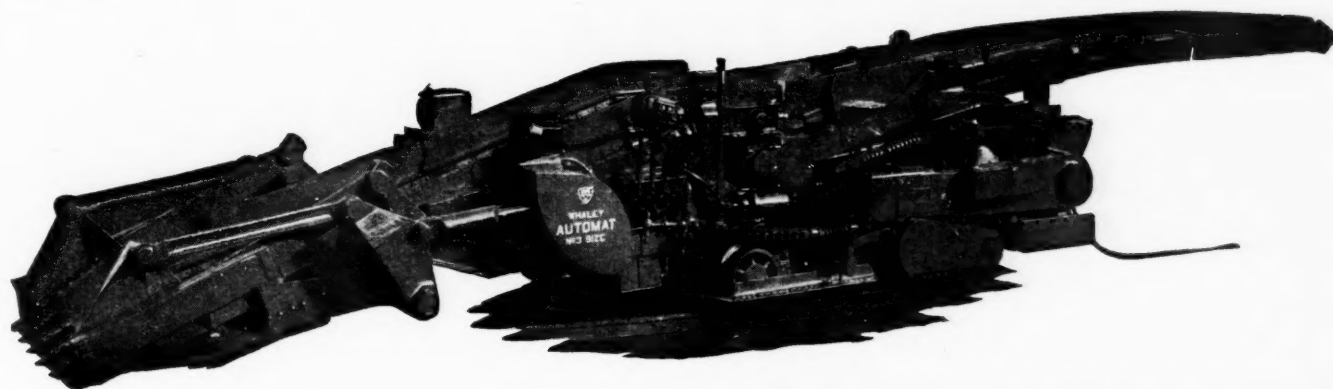
— and many mines are reaping the benefits from the "Automat's" exclusive features, great adaptability and extraordinary service-ability.

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State-Board Questions

Mine Foremen, Indiana

Q.—As a mine foreman, what would you do to lessen the number of falls of coal and roof?

A.—No mine foreman can be present to note, and have corrected, all the bad practices that are likely to occur in the many workings of the mine under his supervision. He must therefore select his firebosses most carefully and train them both by advice and example, whenever, on occasions, he travels with them from working place to working place. He should instruct them so that they will know: (1) what they, as firebosses, should look for—crevices, drummy rock, kettle bottoms, gas, supply of timber, cap pieces and crossbars on hand and defects in posting; (2) what they, as firebosses, should do; and (3) what they should say to the men at the face and how they should say it.

No Bigger Than His Aids

No One-Man Job.—A mine foreman's record is the total or average of the records of his firebosses. They make or break him both as to safety and as to production. Selection and training of these men therefore are among his principal duties. He cannot evade them and still maintain a good record and, as men cannot always be found who have had experience in the duties of the job, someone must give them their first opportunity to serve as firebosses and accordingly must train them in their duties. However, they should always be men with mine experience, active, quick to size up unsafe conditions, leaders of men, affable but able to give orders that will be obeyed promptly.

Safety First, Shoveling Second.—The fireboss should be sure to see that the roof and sides of a room are inspected and made safe before any coal is loaded out. The shooting of the coal, especially if the coal is cut at the bottom or at a parting and shot from the top down, is certain to shatter the roof in some degree and to further reduce its support. It is true, some roof that is really dangerous at times will hang, even when a conscientious attempt is made to bar it down; but much more frequently is roof ready to fall as soon as the face support is removed, and to fall even at a point a long way from the standing coal at the face that held it firmly until the shot was fired.

Moreover, the gases of the shot may penetrate the roof for some distance from the face and like a wedge loosen roof slabs that, until that time, were safely attached to the more solid roof above them, thus render-

Three Points in Fireboss Training

What to	Do	{	Crevices
	Look for		Drummy rock
	Say		Kettle bottoms
			Gas
			Timber on hand
			Defective posting

ing roof, formerly safe, quite dangerous thereafter. Remember also that roof is always on the move and may become dangerous.

Safety Has Priority

Correct Sequence Spells Safety.—In consequence, the order of operation should be (1) Fire the shot, (2) examine and support the roof, and (3) load out the coal. Do not fire the shot, load out the coal and then examine and support the roof, or before long someone will have to carry out the dead bodies. The miner must be made to realize the importance of this duty and how and when to perform it, and the fireboss should be able to detect what men are evading it. Too often these are some of the most industrious and well-meaning men on the job. They went into the mine to work, and cannot bring themselves to realize that safety is a greater necessity than tonnage.

Whenever the fireboss is at the face, he should himself mark on the roof the loose rock and its extent, warning the face men that taking down roof may reveal extensions of looseness not immediately apparent. All loose drummy slabs should be taken down and, if necessary, the slate above them should be timbered. Usually, the fireboss should try to stay until safety is assured. At least, he should leave behind a clear understanding of what, when and where work should be done and who should do it, with the understanding that the judgment of the men at the face should be exercised in determining what else should be done to render the place safe. Not what is said, but what sticks in the minds of those addressed is what counts.

Keep Roof "As Is"

Keep Salts Undissolved and Roof Unbuckled by Expansion.—In summer, the mine roof becomes dangerous because: (1) it becomes wet with sweat and thus be-

comes weakened apparently by the solution of its binding salts; (2) it becomes stressed by its expansion and accordingly buckles between the still unwetted abutting rocks; and (3) the exposed slabs being expanded, buckle more than the unexposed, and therefore the drier, rocks above them. In Indiana, therefore, it is becoming customary to protect the roof from deterioration and stress by cooling the entering air with cold water sprays after which it is dried by contact with water eliminators, so that the air has no more moisture in it than it can carry as a vapor or, what is the same, as a gas, and thus does not deposit liquid moisture. Water, we say, has three "phases"; a solid, "ice"; a liquid, "water"; and a gas, "water vapor" or "steam." It is liquid water and steam that are most destructive to mine roof.

Status Quo in Mine Rock

Uniformity in Moisture Desirable.—In winter, the roof should be protected from losing any of the natural moisture which, in the absence of evaporation, it can carry in its pores without loss. The air entering in the winter should be conditioned so that it will contain when entering the mine just enough water vapor that it will not rob the rock of moisture by causing evaporation, nor add any moisture to it. The continued presence of the natural moisture will prevent shrinkage and so preserve the rock from the tension or stretching stresses that follow dryness. Just as differential moisture separates one rock layer from another, so also does differential dryness. As moisture makes rocks expand and buckle between abutting rock masses, so does dryness make rocks contract thus subjecting them to stretching and rupture.

Proper Rock Support Essential.—However, the roof along haulage roads also must be given the due support of pillars. Withdrawing too large a percentage of coal causes the floor to squeeze and the coal to crush with resultant injury to the roof. In face entries, by omitting the driving of rooms in the room entries for 100 to 300 ft., large unbroken side pillars of that width can be left for the support of the roof. These pillars can be left until the mine is to be abandoned. They will furnish sufficient production to make their ultimate removal profitable. An old mine cannot be worked if its tonnage falls below a certain figure.

Continuing the operation of a large mine, merely to withdraw the small pillars that have been left on the advance of hogged-out workings, does not pay operating costs—supervision, haulage, ventilation and drain-

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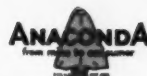
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age. Chances should never be taken to get a few more tons of coal in the advance, for thereby lives are endangered, thousands

of dollars worth of machinery are jeopardized and the upkeep of roof and roads is made excessively expensive.

Mine Foremen, Pa., Bituminous

Splits Vs Air Volume

Q.—(a) In a certain mine, 78,000 cu.ft. of air per minute reaches an area where certain entries have to be ventilated. Allowing 10 cu.ft. per person above the quantity required by law, what will be the least number of splits into which that current of air may be divided legally without first obtaining written permission from the State mine inspector, provided each split is manned by the maximum number of persons allowed in a single split?

(b) What is the least number of splits that can be used in that area if written permission is obtained from the inspector to increase the number of men in those splits to the number which he is permitted to authorize?

(c) If the available 78,000 cu.ft. represents 60 percent of the air entering the mine how many cubic feet of air enters the mine per minute?

(d) If the total liberation of methane is 500 cu.ft. per minute, what will be the percentage of methane in the main return-air current near the outlet, if any increase in volume due to change of temperature or pressure or the entrance of any air from the surface in to the intake or return be disregarded? Give the formula or show the method by which your answers are obtained.

Legal Number of Splits

A.—(a)*The law requires that 200 cu.ft. of air shall be provided per person. Therefore, under the terms of this question $200 + 10 = 210$ cu.ft. will be provided per person. So the number of persons will be the quantity of air divided by the number of persons; $78,000 \div 210 = 371.4$ persons. As the mining law of Pennsylvania restricts the number of persons in any one split to 70 (unless the State mine inspector gives written permission for more men to be employed in that area) as many splits can be operated as there are 70s in 371 or $371 \div 70 = 5$ splits with 21 persons left over. These would have to be provided with another, or sixth, split.

If Inspector Allows

(b) The State mine inspector may permit 90 men to work in a split. Provided he gives written permission for such a number, the 371 men can be arranged in as many splits as there are 90s in 371; therefore the number of splits = $371 \div 90 = 4$ splits plus 11 men; so it will be necessary to have 5 splits.

(c) If only 60 percent of the air entering the mine is delivered to the splits, the quantity of intake air will be represented by 100 when the quantity of available air is

represented by 60, so the quantity of intake air will be $100 \div 60 = 1.6666$ times the quantity of air available for splitting, but this air the question (a) declares is 78,000 cu.ft. per minute. So, if 78,000 is multiplied by 1.6666 or more correctly $5 \div 3$, you will get the quantity of intake air. The quantity of air entering the mine per minute =

$$78,000 \times \frac{5}{3} = 130,000 \text{ cu.ft. per min.}$$

(d) If to this is added the 500 cubic feet of methane liberated per minute by the entire mine you will get 130,500 cu.ft. per minute as the quantity of air leaving the mine. This is, of course, the quantity barring any increases and losses in volume due to changes in pressure and temperature and to air inleaking or escaping to the surface. So the relative quantities will be $500 \div 130,500$.

That Decimal Point

In the calculation as shown below, three ciphers (000) have to be added to 500, which makes it 500.000, in order that the dividend will be long enough to cover the first subtrahend made by multiplying 130,500 by 3. Because these three ciphers, or digits, have to be added, the quotient must have three digits to the right of the decimal point, so instead of writing 3 you write .003. Having the decimal point properly located, you cannot go wrong when you proceed to get the second or succeeding subtrahends. But the quotient after it is obtained is a proportion or ratio between the methane and the air and not a percentage. To get the latter multiply by 100; that is, remove the two ciphers you have been at such pains to add, and you get .38 instead of .0038. So .38 percent is the percentage of methane. Thus, the answer to the question is 0.38 or almost 0.4, or four-tenths of one percent.

Divisor	Dividend	Quotient
130,500	500.000	.0038
1st. subtrahend	391 500	
	108 500	
2d subtrahend	104 400	
	4 100	

Divisor	Dividend	Quotient
78,500	500.000	.0064
	471 000	
	29 000	
	31 400	
	-2 400	

This is a satisfactory percentage of methane in the return, but the percentage on leaving the splits, would be more, for there the methane will have to be carried by 78,000 cu.ft. instead of 130,000 cu.ft. of air. If all the methane comes from the splits, the volume at the return from the splits will be $500 \div 78,000 =$ almost $0.0064 = 0.64$ percent, which is a somewhat too large a figure for safety, especially as this percentage is that of an air current not far from where men are working. The percentage at the fan is not so important as the percentage at the point indicated, unless other splits than are indicated in the question enter the return between the indicated splits and the fan.

Draining Abandoned Area

Q.—(a) If the water contained in an abandoned area of a mine occupies 1,000,000 cu.ft. and is tapped by three boreholes (each of 6 in. diameter), how long will it take to drain the area if 2,500 gal. of water is removed by this means per minute and 60,000 gal. of water enters the area per hour?

(b) If the water removed is carried away through a ditch, what must be the cross-sectional area of that ditch, if the water travels at a speed of 100 ft. per minute and if the ditch is 20 percent oversize?

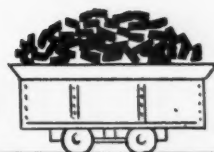
A.—(a) First in questions of this type, always find out how much you are going to gain on the water in each minute, not how long it would take to remove the water if no more were coming in, for that will get you nowhere. According to the question, 60,000 gal. of water enters the abandoned area every hour. This quantity is equivalent to $60,000 \div 60 = 1,000$ gal. per minute. Hence, the net quantity removed per minute from the abandoned area is only $2,500 - 1,000$ gal., or 1,500 gal. per minute. Now you know how much old water you are draining: only 1,500 gal. per minute. For rough calculations, 1 cu.ft. of water may be considered as equal to 7.5 gal. Consequently, the quantity of water occupying 1,000,000 cu.ft. when drainage commences will equal $7.5 \times 1,000,000 = 7,500,000$ gal. As a net quantity of water equal to 1,500 gal. is removed per minute, the entire quantity of 7,500,000 gal. and also all the entering, or new, water will be removed in $7,500,000 \div 1,500 = 5,000$ minutes. Dividing by 60, the time will be $83 \frac{2}{3}$ hours, or $83 \frac{1}{2}$ hours or 83 hours and 20 minutes.

Ditching the Effluent

(b) As 2,500 gal. of water drains out of the abandoned area per minute, and as a cubic foot is equal to 7.5 gal., the quantity, old water and new, moving out every minute is $2,500 \div 7.5 = 333 \frac{1}{3}$ cu.ft. As the speed of travel is 100 ft. per minute, the cross-section must be $(333 \frac{1}{3}) \div 100 = 3.33 \frac{1}{3}$. But as the question declares that 20 percent more cross-section has been provided than this would involve, we should estimate the cross-section as

$(3.33 \frac{1}{3}) \times (120 \div 100) = (3.33 \frac{1}{3}) \times 1.2 = 3.996$ (+), or actually 4 sq.ft., as it would be if the values had been figured out at infinite length instead of to only two places of decimals.

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Operating Ideas

Level-Deck Cross-Track Hoisting Car Saves Labor

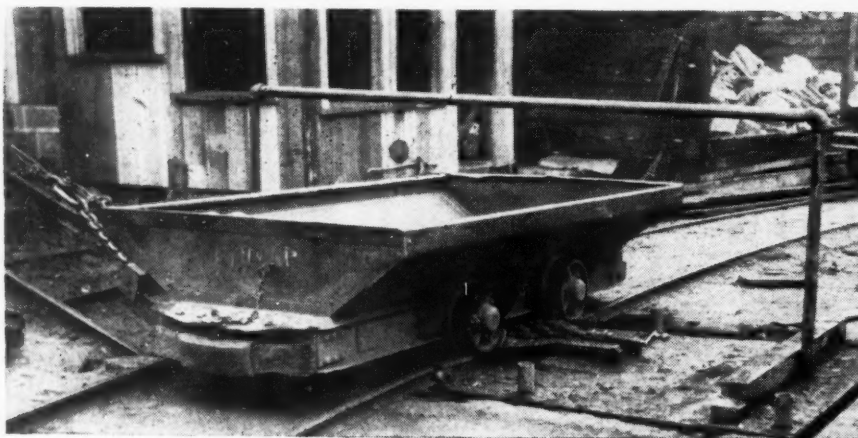
ON SUPPLY INCLINES at three mines of the Logan County Coal Corp. and the Amherst Coal Co., operating in southern West Virginia, level-deck cross-track supply cars have been installed and have substantially reduced labor in handling supplies from the bottom of the hill to the tramroads at seam level. Timbers and other materials loaded into mine cars in the supply yard at the bottom of the hill need not be rehandled until being unloaded from the cars at the underground destinations.

Compared to handling mine cars directly on the incline track and switching them to yard tracks, less space and trackage is required and changing the rope hitching and safety chains from one type of car to another is eliminated. Some prefer the level-deck arrangement for hoisting men.

According to A. S. J. Hopkins, chief engineer of the two companies, this type of supply car arranged to carry mine cars and other wheeled equipment on its deck is an old idea used in Pennsylvania under the name "transports". Even so, it has been applied at relatively few of the numerous drift mines in the hill-sides of the mountainous states. The Amherst company installed the first one seven years ago at Fanco to serve Amherst No. 1,



Empty mine car about to be landed at the bottom where it will be run into the timber yard and loaded with props.



At the bottom of the hill the supply car deck is flush with the surface of the timber yard. The pipe railing along the center of the car serves as a hand hold when men are being hoisted.



Lower Left—A dogging device on the platform of the transport holds the mine car securely in a central position.

B and C mines. Next, one was installed at the McGregor mines of the Logan County Corp. at Slagle. During the early part of the war, supplies handling at Accoville No. 3 mine of the Amherst Coal Co. was modernized and that project included the third level-deck cross-track transport—shown in these illustrations.

The dogging device to hold the mine-car trucks securely in a central position on the rails of the transport is an ingenious affair quickly adjustable to locked position and handy to slide back to clear the rail when the mine car is moved off. Removing the device from the deck to clear the transport for man hoisting is done simply by lifting it up off the guides attached to the deck.

When the crank screw is turned clockwise the toggles force the two dogs out against the wheel treads. Shoulders or blocks on top of the guides at the end next to the crank serve to keep the base plate from slipping. Its movement in the other direction is prevented by the dogs, which would contact the wheel flanges.

At the bottom of the hill or lower landing the rails of the yard or stationary track extend slightly over the edge of the pit. The ends

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One of the two wheels above was in use for four months on a charging machine where it was daily subjected to repeated loadings of 300,000 pounds. Previously, regular carbon steel wheels would mushroom and have to be taken out of service in two weeks, thus presenting an expensive maintenance problem involving three men to make the replacement. A heat treated wheel of Jalloy steel was substituted and after four months' service removed for inspection. It is the wheel on the right. No appreciable wear can be seen when compared to the wheel beside it that was never in service. If you have an application that requires resistance to abrasion, fatigue and high impact strength write to us about heat treated Jalloy.

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To clear the track so the mine car can be run off, the crank end of the locking device is lifted slightly and pulled back a few inches.

just clear the side of the incline car and thus the gaps to the stationary rails are but an inch or so.

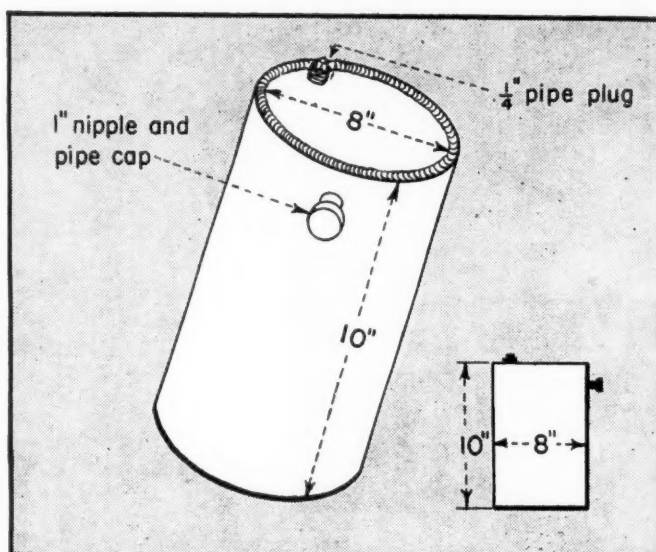
At the top landing, however, the opening in the stationary, or yard, track must be wide enough to pass the mine car sidewise; thus, it must be slightly wider than the over-all length of the car. When the transport is spotted at the top, that of course leaves gaps between the deck rails and the ends of the stationary rails. These are bridged by dropping in short sections of rails, one end supported on the deck and the other on the wall.

At this top landing it is important that there be no strain on the rope when a car of materials is moved from the transport to the stationary rails. Otherwise, the transport will leap ahead and the result may be a wreck. At the landing, a safety chain is permanently anchored to one of the incline rails. When the transport is stopped a few inches above the landing this safety chain is attached by hook and clevis to the front end. Then, the hoist rope is slacked off slightly, leaving the safety chain to hold the car at the exact rail-matching position.

Mine cars filled with sand as well as cars of timber are hoisted on the transport. Even locomotives, when being installed or moved to another mine, are likewise handled on this level-deck car.

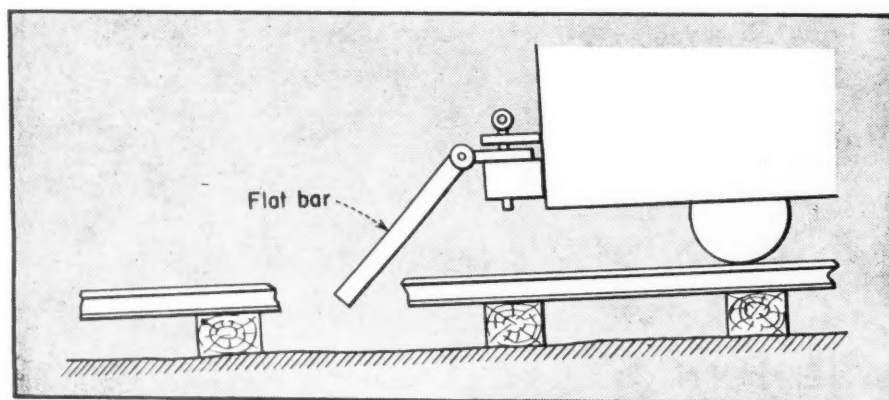
Pipe Container Conserves Lubricant

TO REDUCE SPILLAGE and loss as a result of men leaving covers off the regular oil cans, allowing them to tip over and the like, officials of one eastern coal mine developed a lubricant container that requires keeping the plug cap on. The container, shown in the accompanying illustration, is fabricated from a section of 8-in. pipe 10 in. long. The ends are welded in the shop. A 1-in. pipe nipple with cap is put in the side near one end and the job is completed by a $\frac{1}{4}$ -in. pipe plug in the top. Adoption of this type of container cut lubricant consumption some 20 percent.



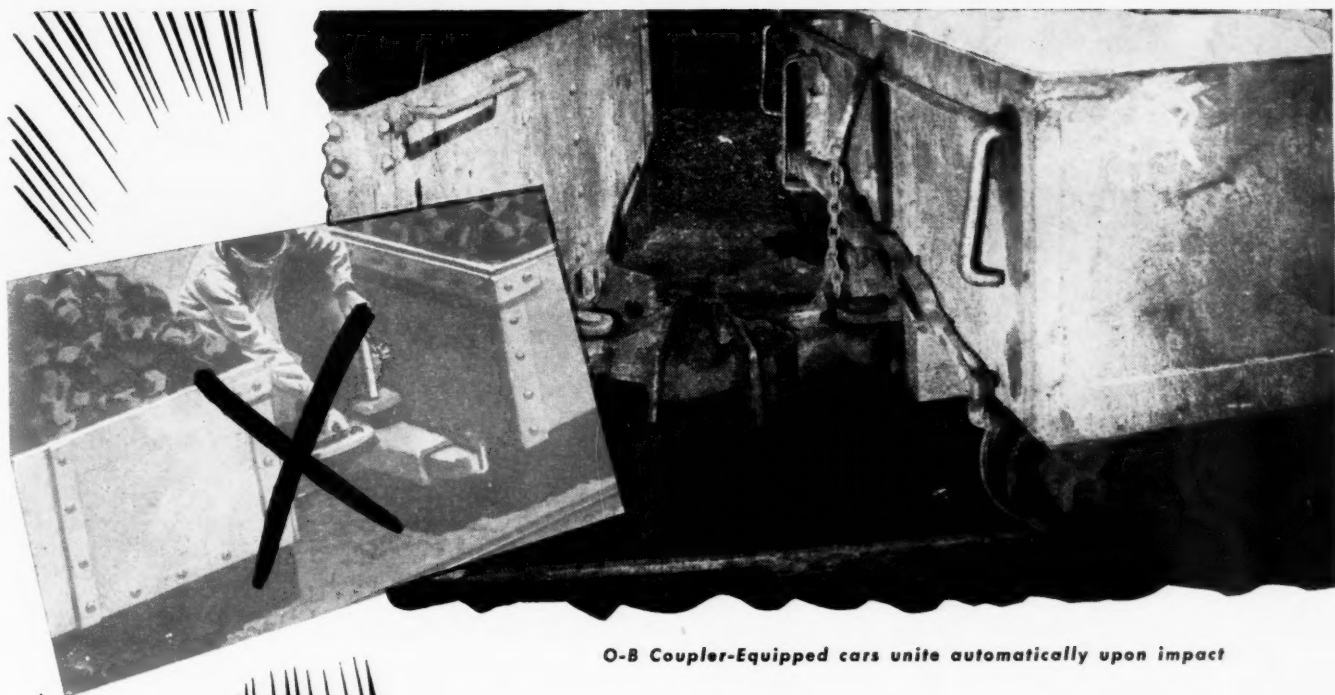
Fabricated of 8-in. pipe, this lubricant container is designed so that the cap must be kept on.

Hinged Drag Provides More-Positive Action



IN A SEARCH for a better safety drag for use behind trips, officials at one eastern coal mine developed a hinged-type unit that provides more positive stopping action. The principle is shown diagrammatically in the accompanying illustration. Weight of the drag is about 80 lb. In action, it is better designed to drop between the ties in an approximately vertical position, thus serving more effectively to prevent the trip running back.

The hinge in this trip drag allows it to drop down between the ties and thus act more effectively in stopping the trip.



O-B Coupler-Equipped cars unite automatically upon impact

O-B Automatic Couplers can help eliminate 1 out of every 5 haulage accidents

Always a serious matter, accidents are expensive . . . in terms of dollars . . . in terms of lost production. According to recent studies, one out of every five haulage accidents may be attributed to car coupling. Crushed hands and knees are frequent with outmoded coupling methods; can take a heavy toll of badly-needed man hours. You can help eliminate troublesome coupling accidents by equipping your mine cars with O-B Automatic Couplers.

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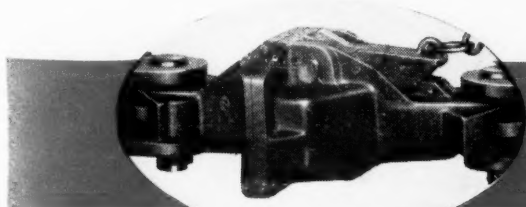
Cars may be uncoupled by raising a lever, safely located on an outside corner of the car body.

Why not take safety into consideration the next time you purchase new mine cars. A postcard request will bring full information as to how O-B Automatic Couplers can be incorporated in your proposed car design at but little additional cost. Write today.

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Pivoted Chutes Improve Belt Operation



The chute for the secondary belt operates from a pivot and also is counterweighted.

Very little spillage occurs at the belt transfer station where the pivoted chute is used.

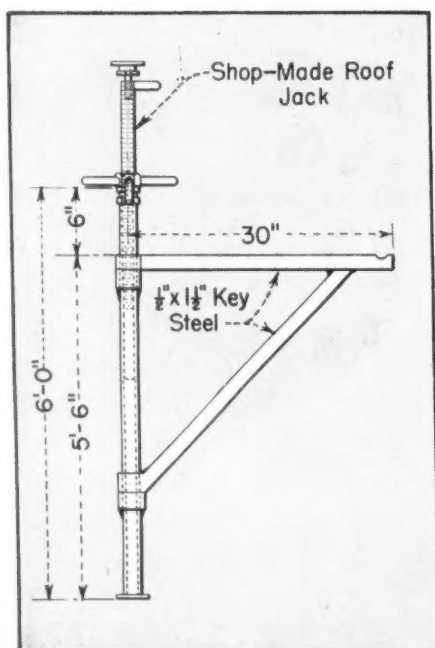
COUNTERWEIGHTED CHUTES at belt-transfer stations improve conveyor performance at the North Diamond mine, West Kentucky Coal Co., Madisonville, Ky.

The steel chute, shown in the accompanying illustrations, virtually floats about a pivot.

When coal comes from the secondary belt the chute swings to its lowest position and directs the coal onto the primary belt. The primary belt, of course, gathers from other secondary belts. Should a large lump of coal already on the primary belt pass a

loading chute it keeps its position on the belt by forcing the chute to raise about the pivot. Since the chute is counterweighted it is easily raised, especially if it doesn't happen to be handling much coal from the secondary belt.

Motor-Change Time Cut in Half by Roof-Jack Gin Pole



CATERPILLAR and pump motors of loading machines are changed in less than half the time formerly required by using a gin-pole roof jack developed by Carl Pape and Mackay Hindman at Montour No. 4 mine of the Pittsburgh Coal Co., Lawrence, Pa. Instead of moving the machine to the shop, the motors now are changed at the face.

In this mine the seam thickness is sufficiently uniform so that the top of the gin pole is positioned 5½ ft. above the floor, thus permitting the use of a small chain block to handle the motors. The loaders are Joy Type 14BU.

Under the old system it took 15 man-hours to change a pump motor and 24 man-hours to change a caterpillar motor. With the gin pole and chain block 6½ man-hours suffices for either. On the basis of maintenance experience during 1944 at this mine, the device would have saved 1,295 man-hours.

For changing pump and caterpillar motors on loaders in 6½-ft. coal.

A Remedy

By definition, remedy means to cure, relieve, correct or repair. That is precisely what an operating idea accomplishes. Ideas presented in *Coal Age* are proven remedies that have, at some operation, corrected a trouble. Won't you tell us about some remedy you've found for a mechanical, electrical, operating or safety problem. If accepted, *Coal Age*, upon publication, will pay you \$5 or more each.

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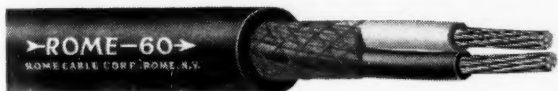
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ROME "60" MINING MACHINE CABLES



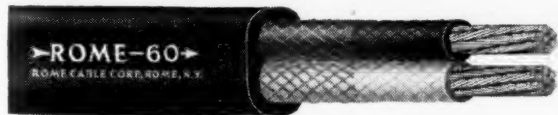
ROME "60" Single Conductor Locomotive Gathering Cable



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Wheel Guards Prevent Foot Injuries

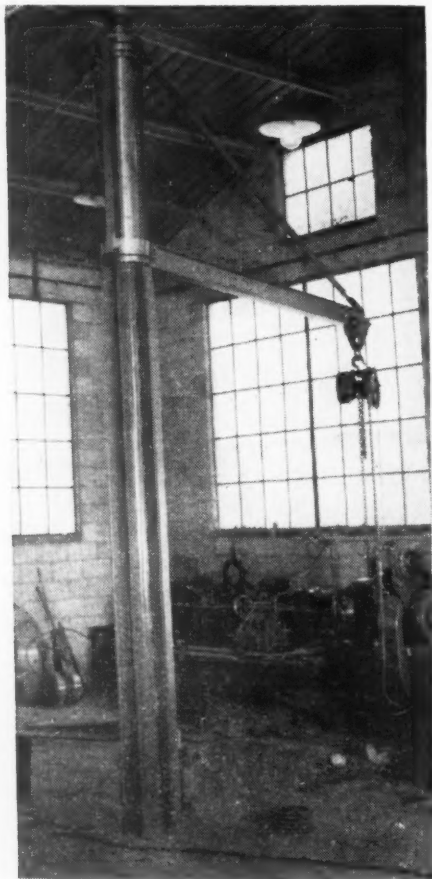


GUARDS HAVE BEEN installed along the sides of locomotives to prevent foot injuries occasioned by the wheels of the locomotive at the Phoenix Coal Co., Minersville, Pa.

The guard, shown in the accompanying illustration, is made of 1x4-in. bar iron and extends past both wheels where it is fastened to the locomotive frame. Aside from cutting down lost-time injuries resulting from feet being mashed by locomotive wheels the guard serves another useful purpose. It serves to keep brake shoes in more perfect alignment. Occasionally brake shoes get out of position and when they do they are less effective. In this instance, the guard prevents any likelihood of the brake shoes getting out of position—at least to the outside of the wheel.

A guard is placed around the wheels on each side of the locomotive to prevent foot injuries.

Shop Jib Crane Has 20-Ft. Sweep



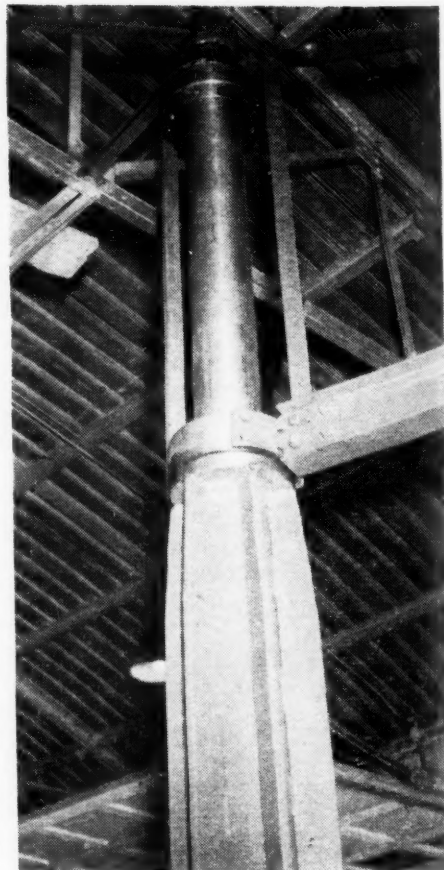
A TOP-SUPPORTED JIB crane serves a lathe and facilitates the loading and unloading of equipment by truck at the shop, says Gus Syers, master mechanic, Delta Coal Mining Co., Marion, Illinois.

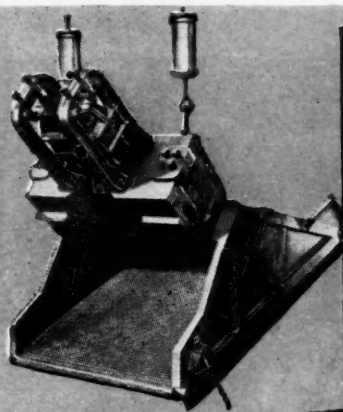
The shop-constructed crane, shown in the accompanying illustrations, has a 20-ft. sweep and carries a $1\frac{1}{2}$ -ton chain-block hoist. The column support, consisting of a 6-in. pipe reinforced with six $\frac{3}{4}$ x3-in. steel ribs, is anchored in the concrete floor and braced by the building's roof braces at the top. The 6x3 $\frac{1}{2}$ -in. 10-ft.-long (17.25-lb.-per-foot) I-beam and bracing swings about the vertical column on anti-friction bearings. Ball bearings take the weight of the load and roller bearings the side thrust. The $1\frac{1}{2}$ -ton chain hoist is shifted along the I-beam track on a carriage that uses old ball-bearing assemblies as rollers.

Even with a moderately heavy load on the hoist, Mr. Syers says the crane can be easily swung around because of the anti-friction bearings.

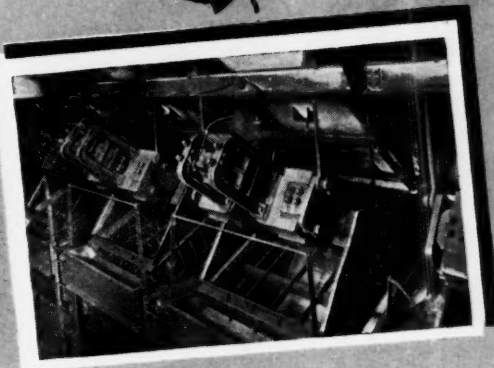
This top-supported jib crane has a 20-ft. sweep.

The swinging bracket turns on anti-friction bearings.

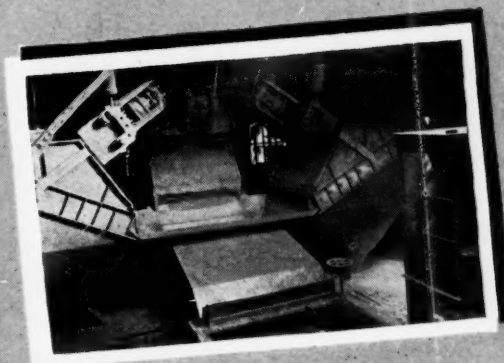
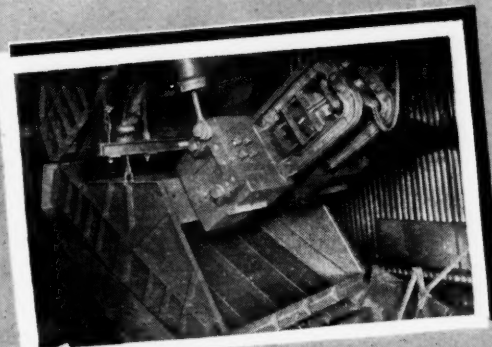




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News Round-Up

Government Signs Bituminous Contract; Anthracite Agreement Ends Strike

Adding to his record a new victory that ended the bituminous strike against the government, John L. Lewis, in the presence of President Truman, signed a contract on May 29 with Federal Coal Mines Administrator Jame A. Krug for the term of federal operation of the mines. The new contract, which grants practically all of Lewis' demands, is expected to drive retail coal prices upward by 25 to 75c., according to various estimates. Full production of coal was resumed on June 3, after the Memorial Day weekend, although the theoretical starting date was May 31.

Major terms of the agreement are (1) a welfare fund financed by a royalty of 5c. a ton to be paid by producers and administered by a three-man board, one member appointed by the miners, one by the government and the third by joint nomination; (2) sole union control of medical and hospital funds now paid by the miners through check-off by the operators; (3) a \$1.85 a day wage increase retroactive to May 22, the date of government seizure of the mines; (4) mandatory compliance with safety recommendations of the U. S. Bureau of Mines; (5) unrestricted power of miner safety committees to remove men to safe areas until and unless the Federal Administrator determines that the power is being abused; (6) observance of National Labor Relations Board rulings on unionization of foremen along the lines laid down in the Jones and Laughlin steel case; (7) a vacation period, June 29 to July 8, with increase of vacation pay from \$75 to \$100; and (8) retention of the present 9-hour day, portal-to-portal, with overtime after 35 hours.

The full text of the agreement was not shown to the operators' negotiating committee until "late today," said a spokesman for the operators after the contract was signed. Operators said bluntly that if they had been consulted more often during union-government negotiations they might have saved the government from agreeing to terms that would require constant reinterpretation and which "in the end would mean more and more concessions from the operators and the public."

Ending a strike that lasted only eight days, anthracite miners returned to work June 10, following signing by operator and union heads of a contract that closely paralleled the government-concluded bituminous agreement and granted, among other provisions, a wage increase of \$1.29½ a day, a welfare fund of 5c. a ton, boosts in travel-time and vacation pay, acceptance of Pennsylvania

compensation laws and adherence to federal safety recommendations. Operators estimated that the new contract would cost the industry \$50,000,000 to \$60,000,000 yearly, with an increase of \$1 a ton in the retail price being necessary.

Seizure Ineffectual

Seizure of the mines effective May 22 and drastic Presidential action in the strike of two railway unions failed to prevent a second work stoppage in the bituminous industry at midnight May 26. This second walkout terminated a two-week truce granted by Lewis May 10 after the mines had been closed since April 1, when he terminated the bituminous agreement. Seizure also failed to halt a spread in unauthorized work stoppages in Pennsylvania and other mining states, although it apparently brought to an end the activities of roving bands of pickets that had steadily enlarged the roster of non-operating mines, particularly in the Keystone State.

The second walkout followed after Lewis refused to back down in the face of capitulation by the railway brotherhoods and a request by President Truman May 25 for emergency legislation to strengthen his power to deal with strikes. Truman asked for power to seize any industry whose stoppage jeopardized public safety, convenience or welfare, to require management to co-operate, to impose penalties on labor leaders, employees and employers fostering strikes or lockouts and to draft into the Army persons refusing to return to their jobs after government seizure. These emergency powers were to extend six months after the end of hostilities.

The bill granting the President these and other powers was passed by the House the same day but ran into opposition in the Senate, which preferred to proceed with the Case bill previously approved by the House and emasculated by the Senate Committee on Labor and Education. The Senate restored to the Case bill on May 25 provisions requiring labor leaders to bargain collectively the same as employers, providing for federal mediation and "cooling-off" periods with provision for final and binding adjustment of grievances in agreements, canceling NLRB rulings that unions of supervisory employees are entitled to bargaining-agent status under the Wagner Act, providing for special fact-finding boards for public utilities, making it possible to sue labor



unions for violation of contracts, prescribing loss of status as employees under the Wagner Act for persons involved in wildcat strikes, outlawing "secondary boycotts" and subjecting unions to anti-racketeering legislation. Reports were that the House probably would accept the Senate action but that Truman would veto the measure, perhaps using his recommendation that Congress take six months to study revisions in labor legislation.

All this medicine, however, had no effect on Lewis, who still held out in spite of conferences with Secretary Krug, appointed Coal Mines Administrator under the seizure order, as well as with Truman on May 26, the last day of the truce period.

Seizure of the bituminous mines was ordered by President Truman May 21, and at 12:01 May 22 Secretary Krug took them over, appointing Vice Admiral Ben Moreell, who operated seized oil properties for the government during wartime, as deputy administrator. "Regulations for the Operation of Coal Mines under Government Control," issued in May, July and December, 1943, were placed in effect immediately, and operating managers for the United States were directed forthwith to fly the flag of the United States at each of the mining properties taken over. The seizure order also directed Krug to bargain with the miners for a contract. The Office of Price Administration and the Director of Economic Stabilization previously issued orders granting operators permission for adjustable pricing to be scaled to wage increases and other costs once a contract is negotiated.

Shortly before the White House announcement of the seizure the operators' negotiating committee wrote to the President that "the committee will recommend to its principals full cooperation to secure maximum production during the period of government control," but directed attention to the fact that "the effectiveness of the cooperation will depend upon the judgment of individual operators as to whether the fundamental rights of management and ownership are adequately protected." The letter further requested that operators be consulted on government negotiations for a wage agreement for the period of federal operation.

Seizure was preceded by rejection of arbitration by both sides after Lewis had resumed negotiations April 29 after breaking them off April 10. Resumption, however, found him still adamant on not only his original demands but also on a new one—an alleged claim for overtime pay arising out of holidays after the cessation of hostilities in 1945. To clear the way for discussion of other demands, the operators,

after Lewis granted the truce May 10, agreed May 13 to grant the back-pay demand to the tune of some \$3,000,000, refusing to admit, however, that the demand had any merit and warning that payment did not establish a precedent for future action.

The operators' concession, however, made no change in Lewis' tactics of insisting on agreement on each new demand as it was presented rather than presentation of them all for consideration by the conference. He insisted that the operators agree to his demand for a welfare fund, and instead of putting it on a basis of so much a ton, as he did in 1945 when he asked for 10c., he proposed a levy of 7 percent on payrolls to produce more than \$70,000,000 a year, this to be paid entirely by the operators and administered solely by the union. On May 14 he set forth the purposes as follows:

"1. To furnish adequate and modern medical service to the coal miners and their dependent families with a choice of physicians, which in many areas, particularly in the South, they do not now have. We plan to replace the present company doctor scourge.

"2. To provide adequate hospitalization under proper standards.

"3. To provide insurance, life insurance and health insurance for the miners, which they can not now purchase. Life insurance now costs the mine worker about 277 percent of what it costs people in sedentary occupations. Obviously, he cannot purchase it at that price. Obviously he has no insurance as a result and his family is unprotected in case of death by violence in the mines or from natural causes. This fund can provide insurance on a mass basis much more cheaply than the individual can buy it himself, even if he is capable of buying it, which he is not.

"4. The fourth reason is rehabilitation. Men who are injured and disabled in the mines through the loss of limbs, blindness, or other major physical injuries, need rehabilitation. There are no facilities available to the mine workers now and there are probably living 50,000 men who have been incapacitated from further mining through incapacity who have received no assistance in rehabilitation or training for other vocational employment.

"5. The fifth reason is economic aid in distress or hardship cases. Families that become impoverished because they have not received compensation provided by the States due to the manipulation of the company-doctor system and by reason of testimony of the company doctor, which is the only medical testimony available because no other doctor is permitted to attend the victim. The mine worker cannot secure other medical testimony to refute the claims of the company doctor. In consequence, his award for total disability may be cut to as low as 30 percent and his family becomes impoverished. There are thousands of such cases.

"6. If any money is left in the fund, we propose to use it for cultural and educational work among the mine workers."

Restating his position and tactics Lewis declared that "the mine workers have no intention to negotiate a contract now or later that does not provide for such a fund and for such protection to the mine

workers. It is a condition precedent to the making of any agreement."

Lewis also was reported to have offered a compromise on his demand for unionization of mine supervisory employees. Under the terms of his proposal, the union would allow exemption of one mine superintendent, one mine manager, one foreman underground and two assistant foremen underground, this number to be the same in each mine regardless of size. All other supervisory employees would be subject to the contract and their membership in the union would be compulsory.

Full support of Lewis' welfare fund was voted by the U.M.W. policy committee, and the American Federation of Labor fell in line to back up his demand. The operator representatives, however, refused to accept the demand May 15 on the grounds that the committee could not possess authority to make such a commitment for the industry, the demand was not in the nature of wages, hours and working conditions, there was no accurate measure of the extent of the expenditures that might be involved and the demand constituted double taxation since coal already was paying out 9.97c. a ton for similar purposes. Pointing to their previous offer to explore establishment of a fund to alleviate hardship cases, the operators also declared the question to be "a matter of public concern and therefore a problem that should be considered not by the wage conference but by public legislative bodies and then only after a complete and thorough investigation by such legislative bodies of all the problems involved."

With Lewis persisting in his demands, both sides reported to the President May 15 that agreement could not be reached. On May 16, Truman proposed arbitration, which was turned down by both the operators and Lewis, the latter stating that he had no authority to agree, and the operators contending that in view of the new and far-reaching nature of the demands "the industry, and it alone, must make the decision in each case as to how far it can go in the surrender of its hitherto unchallenged functions. The industry cannot delegate that authority to anyone else. The operators must, therefore, with all respect, decline the suggestion for the appointment of a general arbitrator."

With no developments beyond that point, the seizure order was issued May 21. Lewis took no action to extend the truce period despite government requests to do so, contending that under the Smith-Connally Act he had no choice but to stay out of the affairs of the miners and it was up to them to act as they saw fit. He reinforced this with a notice May 24 that there would be no further meetings of the union policy committee pending "clarification" of the "infamous Smith-Connally slave statute." Meantime, increasingly severe measures were taken to control distribution of available coal supplies while shortages forced a snowballing of industry closings. Some of the controls were relaxed when the truce was announced but the government assumed full jurisdiction over the production during that period.

In the midst of developments in Washington word came from Illinois that Progressives had signed a contract to work till

June 15 on a retroactive basis, pending decision on terms of a permanent contract now being negotiated. On May 26, 32 Illinois mines were returned to their owners.

While the stalemate continued in bituminous negotiations the Anthracite Joint Wage Negotiation Conference, which convened in New York City May 10, reported little progress. U.M.W. representatives called for the same kind of union-controlled health and welfare fund demanded of the bituminous operators and asked operators to include present portal-to-portal pay and pay for reduced lunch-hour time in the fixed wage scale. Lunch-hour and portal-to-portal pay were granted as supplementary increases by the War Labor Board in 1944. Other demands included unionization of supervisory and clerical help, a general wage increase of an unspecified amount, a reduction in the present 35-hour working week and improvement of safety practices. With little progress beyond an exploration of the situation, the union, which already had filed a strike notice, served notice May 25 that it would terminate the agreement May 30. The operators, however, urged that the contract be extended on a retroactive basis.

Truax-Traer Buys Strip Land

Purchase of 2,000 acres of coal-stripping land between Duquoin and Pinckneyville, Ill., by the Truax-Traer Coal Co., Chicago, was recently announced. It is reported that operations in the new area will be larger than the present Elkhart workings of the company, which produce 6,000 tons daily from combined shaft and strip operation. It is not expected to be put in operation until the company's Elkhart holdings near depletion, said to be from 10 to 20 years.

Land north of Brazil, Ind., owned by the Zeller & McClelland Coal Co. has been conveyed to the Vandalia Coal Co., according to a recent announcement. Plans for development of the property have not yet been released.

Opening of a new 1,800-acre coal field between Belington and Philippi, W. Va., was announced May 11 by the Tasa Coal Co., Zelienople, Pa. A new deep-shaft mine will be put in soon at a cost of \$300,000, according to L. J. Ziegler, superintendent of the new operation.

Flood-Control Program Urged For Anthracite

A cooperative industry, state and federal flood-prevention program for the Pennsylvania anthracite region has been recommended by Dr. R. R. Sayers, director of the U. S. Bureau of Mines. The first step suggested is a thorough engineering study of current mine-water problems.

A preliminary investigation already has been made by S. H. Ash, chief of the Safety Division of the U. S. Bureau of Mines, and James Westfield, mining engineer, Wilkes-Barre, who found that at some collieries the ratio of tons of water pumped to the tons of coal produced underground had increased from 8 to 1 in 1920 to 30 to 1 in 1942.

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Coal's Economic and Mining Prospects Canvassed at Mining Congress Meeting

COAL-INDUSTRY economics, locomotive research, domestic marketing, preparation, restoration of stripped-over lands and deep- and strip-mining methods were highlights of the 1946 coal convention of the American Mining Congress, held at the Netherland Plaza Hotel, Cincinnati, Ohio, April 29-30.

Keynoting the opening session Monday morning Julian D. Conover, secretary, American Mining Congress, paid high tribute to the war record of the coal industry, achieved in spite of manpower shortages, labor difficulties, government controls and rising costs. "The industry is now in a period of stress," said Mr. Conover, but he called attention to coal's survival of other historic upheavals and voiced his belief in the industry's future.

Integration of the industry to maintain orderly production and marketing of coal and to lower costs and develop additional uses was urged by G. H. Lamb, assistant director, U. S. Bureau of Mines, who spoke on the economics of the industry. Mr. Lamb was introduced by George L. Smith, vice

president, Rochester & Pittsburgh Coal Co., Indiana, Pa., and national chairman of the program committee, who presided.

Pointing out that wherever coal has been produced throughout the world the economics of the industry has forced either governments or producers to impose stabilizing controls on prices, sales or production, Mr. Lamb analyzed the reasons for the industry's instability as follows: (1) Excess of production over demand, (2) seasonal and unpredictable markets, (3) improvements in mining machinery and burning techniques, (4) demand for a wide variety of sizes and burning characteristics to serve a complex market, (5) a scattered front against competition from oil and natural gas, attributable to the large number of independent operators with varying costs and distant markets and (6) excess capacity, leading to intra-industry competition. These handicaps, the speaker declared, are of critical importance in the transition from wartime to peacetime production, and he urged industry-wide integration through voluntary controls, to-

gether with mechanization and better utilization, to bring about orderly production and marketing and to lower mining and marketing costs. The industry must meet these problems squarely because of coal's significance in the nation's economy, the speaker concluded.

A prediction that coal-burning gas-turbine locomotives now under development can match the cost of diesel locomotives was made by Dr. John I. Yellott, director of research for the Locomotive Development Committee. Dr. Yellott described new-found methods of pulverizing coal to the fineness of talcum powder for proper burning in the gas-turbine combustor and discussed the apparatus for removal of fly-ash. A range of 4,000 to 8,000 hp. is expected from a single 100-ft. long locomotive, and a thermal efficiency of above 20 percent with a fuel cost of only 25 to 35 percent of diesel cost can be attained, he contended. "The gas turbine will probably cost less than the diesel, but it will be able to burn any fuel, ranging from bituminous coal to lignite. Through its use it is expected that the railroads will be free of any concern over the increasing costs of liquid fuels."

Emphasizing the unfairness of comparing 20-year-old steam locomotives with new diesels, Dr. Yellott called attention to the new four-cylinder Pennsylvania T-1 duplex, which competes on even terms with the diesel in fuel costs and monthly mileage, although the steamer costs only \$42 per rail horsepower while the diesel costs about \$110.

Locomotive Improvement Urged

Improving the performance of 39,000 steam locomotives now in use was urged by George A. Ritchie, general fuels superintendent, Chesapeake & Ohio Ry., who discussed Dr. Yellott's address and expressed gratification for the work of the Locomotive Development Committee. Over-fire air jets, better drafting, undergrate air distribution, handling methods to prevent breakage and disintegration and better quality and uniform preparation were proposed by Mr. Ritchie as steps for immediate action pending full development and road tests of the gas-turbine locomotive.

Further improvement of steam locomotives now in use calls for the utilization of all steam produced, according to R. P. Jones, Franklin Ry. Supply Co., New York. The Franklin steam distribution system is used in the Pennsylvania's T-1 locomotives to reduce fuel and water consumption and is available for installation on locomotives now in service.

A warning to railroads that invest heavily in diesels was sounded by J. E. Tobey, Fairmont Coal Bureau, New York, who pointed out that diesel fuel, destined to increase in cost and decrease in supply in the next few years, will create problems for diesel-equipped railroads. Praising the coal producers and railroad officials who are supporting locomotive research, Mr. Tobey urged installation of the Franklin valve system on old locomotives, continued study of coal preparation and utilization and further investigation of air flow and combustion methods.

Coal must fight for its markets on three fronts—distribution, use and production—if it is to retain its present 95-million-ton



Economics and utilization—R. H. Morris (left), vice president, Gauley Mountain Coal Co. and vice chairman; B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co.; G. A. Lamb, assistant director, U. S. Bureau of Mines; Dr. J. I. Yellott director of research, Locomotive Development Committee; George L. Smith, vice president, Rochester & Pittsburgh Coal Co. and national program chairman; and G. B. Southward, American Mining Congress



Coal preparation—W. B. Jamison (left), chief engineer, Jamison Coal & Coke Co. and vice chairman; D. H. Davis, product control manager, Pittsburgh Coal Co.; Laning Dress, preparation engineer, Pyramid Coal Corp.; Joseph Pursglove Jr., president, Pursglove Coal Mining Co. and chairman; and W. H. Lesser, Pierce Management.

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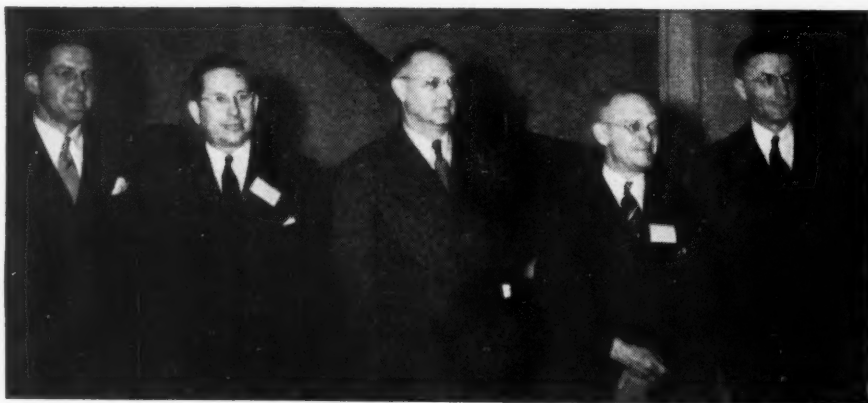
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Deep mining—Frank G. Smith (left), Sunday Creek Coal Co., chairman; George R. Higinbotham, production manager, Consolidation Coal Co.; J. J. Snure, assistant production manager, Rochester & Pittsburgh Coal Co.; William Burnett Jr., electrical engineer, Peabody Coal Co.; and T. F. McCarthy, manager, Coal Department, New York Central Lines.



Strip reclamation—J. W. Bristow (left), secretary treasurer, Illinois Coal Strippers' Association; Hugh B. Lee, vice president, Maumee Collieries Co., chairman; and L. E. Sawyer, director, forestry and reclamation, Indiana Coal Producers' Association.



Strip mining—T. G. Gerow (left), vice president, Truax-Traer Coal Co., chairman; R. M. Dickey, Bucyrus-Erie Co.; J. G. Berry, Tire Engineering Department, United States Rubber Co.; and Clayton Ball, Paul Weir Co.

home-heating market and secure a reasonable share of business from new dwellings, declared B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co., Chicago. "Probably more so now than ever before coal's future in the market for domestic heating depends upon its ability, through excellence of product, efficiency of distribution and convenience of use, to satisfy highly cultivated human desires." Pointing to re-conversion delays in production of new coal-burning heating equipment, Mr. Gebhart

stated that vigorous measures involving co-operation of producers, shippers and retailers are essential to improve service to and satisfaction of domestic customers while manufacture of improved equipment is awaited.

Basic responsibility for quality of product rests on producers, and improvement and extension of the market depends on uniform preparation and cleaning in accordance with the highest standards, Mr. Gebhart continued. Referring to the National Coal Association's marketing program, he empha-

sized the importance of coordination at all levels of the industry to implement the marketing plan.

N.C.A.'s program represents an intelligent approach to the industry's marketing problem, said Earl C. Payne, consulting engineer, Consolidation Coal Co., New York, in discussion. In view of the immediate shortage of domestic heating equipment and to achieve long-term economy, cleanliness and convenience, he urged installation of residential group heating plants for new housing areas. Continuing the discussion Carroll F. Hardy, chief engineer, Appalachian Coals, Inc., Cincinnati, advocated continued study of smoke abatement as one answer to coal's competitors.

Although pointing out that there is very little information available on the costs of heavy-media processes for coal separation, D. H. Davis, product control manager, Pittsburgh Coal Co., predicted that the method will have wide application in certain cases where conventional systems will not produce the results required as the better seams are mined out and mechanical mining is extended. In his paper, titled "Heavy Density Processes for Coal Separation," accompanied by slides, he described all the new processes by separating on a gravity basis or at least more on a gravity basis with less dependence on size. Mr. Davis opened the Monday afternoon session on coal preparation, presided over by Joseph Pursglove Jr., president, Pursglove Coal Mining Co.

Heavy Media Now Used

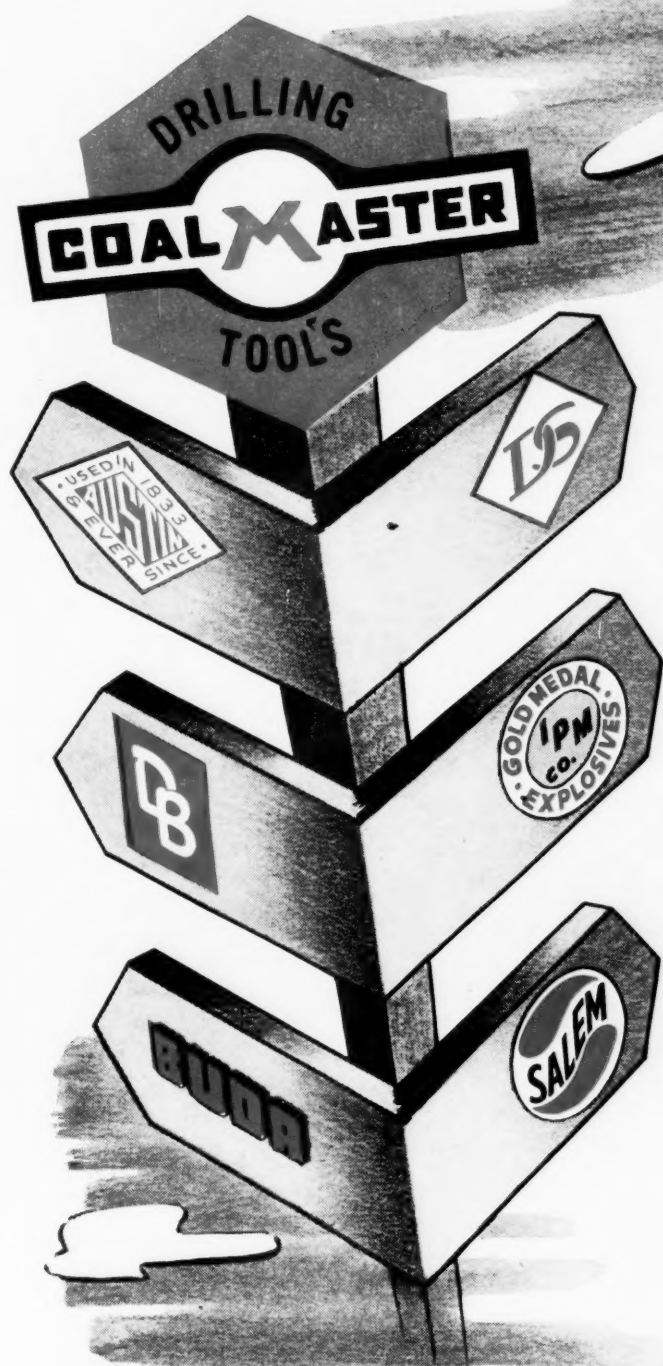
The processes employing suspensions are the Chance sand flotation, widely used in this country, and the following three developed in Holland: the devooyos or Barvoys, using barytes combined with the clay that occurs in the coal; the Tromp, using magnetite; and the Staatsmijnen, using loess—a wind-blown sand. In this country the American Cyanamid & Chemical Corp. is the representative for the newer heavy-media processes. Galena was first used as the heavy medium but this gave way to ferrous media which are easily recovered magnetically.

Mr. Davis mentioned that a large scale pilot plant using magnetite is in operation in this country. This Champion No. 1 plant of the Pittsburgh Coal Co. was further discussed by N. L. Davis, Link-Belt Co. He said gratifying results have been achieved with this 100-tons-per-hour plant, which has been operated with feeds as high as 150 tons per hour. Basic experimentation will be finished within 60 days after the coal mines go back to work. He also remarked that in Europe, which is 10 years ahead of this country in heavy-media separation, coal values are double those of this country while their raw coals exhibit greater differences in specific gravities.

Mr. D. H. Davis also included in his paper a description of the cyclone washer invented recently in Holland and employing heavy media for fine coal. This cyclone thickener, using loess, provides exactness of separation and high washing efficiency. At low gravities the efficiency is much higher than with conventional fine-coal washers. Three other heavy media processes were mentioned: the Wuensch, used by the Pittsburgh & Midway Coal Mining Co., the H. & H. float-and-

(Continued on page 124)

7 SIGNS TO BETTER DRILLING TOOL SERVICE



COALMASTER Drilling Tools have long been the choice of progressive mines for drilling straighter, cleaner holes in record time—with less power, less strain, more safety.

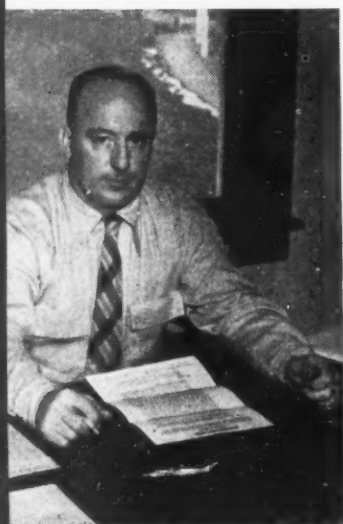
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- **DIAMOND SUPPLY COMPANY, INC.,**
Evansville, Indiana
- **DOOLEY BROTHERS,** Peoria, Illinois
- **ILLINOIS POWDER MFG. CO.,**
St. Louis, Missouri; Denver, Colorado;
Salt Lake City, Utah
- **SALEM TOOL COMPANY,**
Salem, Ohio

CENTRAL MINE EQUIPMENT COMPANY • ST. LOUIS 8, MO.



Claude Congleton (seated), treasurer and general manager, and W. P. Mayhew, auditor, Fayette-Jellico Coal Co., Warren, Ky.



S. "Casey" Harmon, general superintendent of stripping operations, Hanna Coal Co., Georgetown, Ohio



George M. Pyle, superintendent, Crow Hollow strippings, Hanna Coal Co., Georgetown, Ohio



R. G. Burggraf, chief electrician, Georgetown No. 12 mine, Hanna Coal Co., Georgetown, Ohio

Otis Bledsoe (left), superintendent, and D. D. Saxton, assistant superintendent, Georgetown No. 12 mine, Hanna Coal Co., Georgetown, Ohio



COAL MEN



Dr. H. K. Buttermore (left), president, and H. K. Buttermore Jr., superintendent, Elcomb Coal Co., Harlan, Ky.

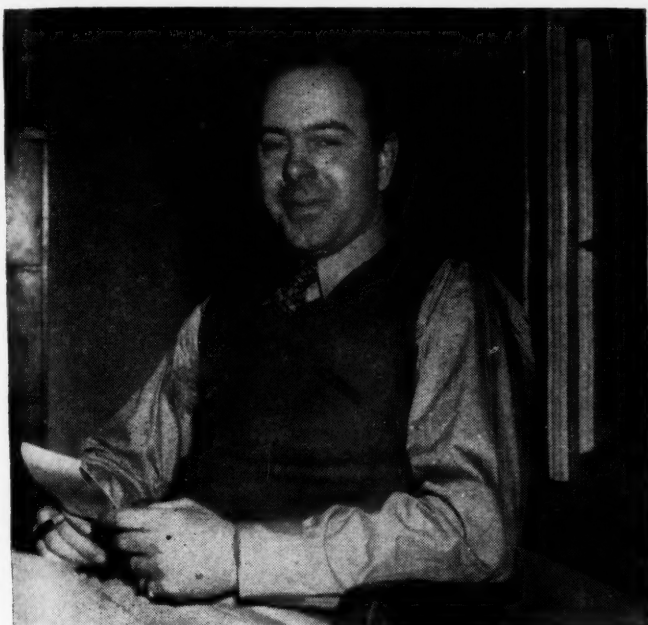


S. H. Tucker (left), assistant general superintendent in charge of maintenance; Jack Lyon (standing), secretary to the general superintendent; and Harry B. Crane, general superintendent, The Elk Horn Coal Corp., Inc., Fleming, Ky. Plaques on the wall signify safety awards for the years 1939-42, inclusive.

Virgil C. Hotsinpillar, superintendent, Mountain Fuel Co., Flemington, W. Va.



ON THE JOB



W. A. Borries, president, Dawson Collieries, Inc., Dawson Springs, Ky.



Bernard W. Yoor (left), safety engineer; **Andrew F. Diamond**, general superintendent; and **H. L. Beattie**, vice president in charge of operations, Davis Coal & Coke Co., Thomas, W. Va.



G. I. Simpson, superintendent, Louisville Gas & Electric Co., Central City, Ky.



Eric E. Laurell, superintendent, Fidelity mine, United Electric Coal Cos., Duquoin, Ill.



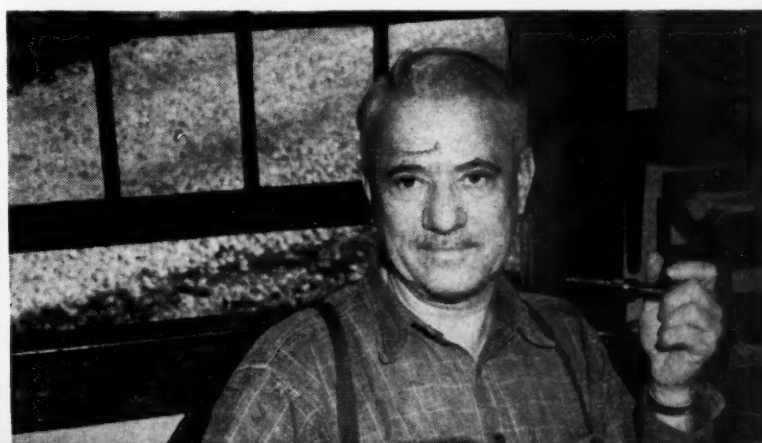
Louis LaSalle, general superintendent, Colony Coal Co., Rock Springs, Wyo.



Charley F. Smothers, superintendent, Sentry Coal Mining Co., Madisonville, Ky.

George R. Piper, outside superintendent, Watson mine, Westmoreland Mining Co., Mooween, Pa.

Frank H. Seymour, general manager, Freeman Coal Mining Corp., Herrin, Ill.



sink process and the Conklin, tried on anthracite in 1922.

Heavy-liquid processes, characterized as being expensive in liquid renewal costs, were included in the paper. Calcium-chloride washers, said Mr. Davis, are limited to low specific gravities although using an upward current. The true heavy liquids are more expensive and make vapors that are toxic. Therefore, equipment using them must be sealed to prevent loss of vapors. Pre-treating the coal with a chemical agent reduces absorption of the heavy liquid into the coal.

Surface Moisture Reduction

Surface moisture reduction by high-speed shaker screens, three types of centrifugal dryers and six types of heat dryers was discussed in a slide-illustrated paper by Laning Dress, preparation engineer, Pyramid Coal Corp., DuQuoin, Ill. He described in particular a 4x16-ft. vibrator in use in a Middle-West preparation plant and dewatering 30 to 35 tons per hour of 1/8-in. washed coal to a surface moisture of 16 percent. This screen, equipped with long slot cloth, is fitted with depressions and dams worked out by J. W. Watling, Robins Conveyor, Inc. Much of the water goes through the screen at the depressions where the coal must climb up over the dams.

Centrifugal dryers are used as a rule for sizes below 1/8 in. because of degradation with larger sizes. An advantage lies in ability to take a feed having up to 80 percent free moisture and dewatering to as low as 5 1/2-percent moisture. Use of a thin bed in the C-M-I dryer allows some of the heavy sand and pyritic particles to be thrown out centrifugally with the water, thus lowering ash. The Carpenter dryer has been improved by elimination of the gear box on top and placing the motor in a different position. It works best with a feed that has been dewatered in a perforated bucket elevator or on a vibrating screen.

A new horizontal-type centrifugal dryer, the Bird centrifuge, or filter, designed primarily for dewatering slurries, has a solid bowl without baskets or screens. Mr. Dress said that test results have been quite impressive, that the maintenance is low and that indications point to this type dryer finding use in the coal industry.

Of the thermal dryers, which are required when surface moisture must be reduced to zero, the following types were described: Raymond flash dryer, Christie rotary dryer, Roto Louvre dryer, Multi Louvre dryer, consisting of traveling louvers positioned like flights on a conveyor, McNally-Vissac screen-type dryer and the S. S. screen-type dryer. None of the Multi Louvre type is in operation but some will be soon.

Mr. Dress went into considerable detail in explaining the characteristics of each type and described specifically the three McNally-Vissac dryers in use at their Indiana mines. C. H. Patterson, director of engineering, McNally-Pittsburg Mfg. Corp., and W. C. McCullough, preparation manager, Roberts & Schaefer Co., were called on to discuss the paper. Mr. McCullough pointed to the importance of the auxiliary equipment with any type of dryer and stated that more drying equipment will result from legislation that bans the emptying of sludge into streams.

W. H. Lesser, Pierce Management, Scan-

Coal Activity

Bituminous Coal Stocks

	Thousands Net Tons	P.c. Change	
		From Mar. 1 1946	From Apr. 1 1945
Electric power utilities...	15,705	+ 6.1	+25.4
Byproduct coke ovens...	8,269	+29.3	+51.6
Steel and rolling mills...	1,002	+42.1	+38.2
Railroad (Class I)...	13,233	+19.5	+32.8
Other industrials*	17,172	+13.8	+30.3
Total.....	55,381	+15.3	+32.3

Bituminous Coal Consumption

	Thousands Net Tons	P.c. Change	
		From Feb. 1946	From Mar. 1945
Electric power utilities...	5,110	+ 3.7	-17.3
Byproduct coke ovens...	7,101	+89.7	-11.8
Steel and rolling mills...	817	+19.6	-12.7
Railroad (Class I)...	10,396	+ 5.8	- 8.9
Other industrials*	11,985	- 1.0	- 7.8
Total.....	35,389	+13.1	-10.5

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

April, 1946, net tons.....	3,210,000
P.c. change from March, 1946.....	-94.3
January-April, 1946, net tons.....	164,070,000
P.c. change from Jan.-April, 1945....	-16.5

Anthracite Production

April, 1946, net tons.....	5,061,000
P.c. change from March, 1946.....	-7.8
January-April, 1946, net tons.....	20,323,000
P.c. change from Jan.-April, 1945....	+7.1

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Oil Burners
March, 1946.....	15,662	27,546
P.c. change from March, 1945.....	+167.9	+307.4
January-March, 1946.....	43,191	74,836
P.c. change from Jan.-March, 1945.....	+189.6	+337.2

Index of Business Activity*

Week ended May 25.....	157.5
Month earlier.....	166.3
Year earlier.....	224.9

*Business Week June 1.

Electric Power Output†

Week ended May 25, kw-hr.	3,941,865,000
P.c. change from month earlier....	-0.8
P.c. change from year earlier.....	-9.0

†Edison Electric Institute.

ton, Pa., in his presentation of "Cleaning Anthracite Small Sizes," devoted considerable time to a description (with slides) of the Hauto breaker put into use June, 1944, by the Hauto Coal Co. and which ships 1,200 tons per day of two 7-hour shifts from a run-of-bank feed of 4,000 tons. Much of the bank material was cleaned once before and some of it twice. A 12-ft. Chance cone works mixed sizes—egg, stove, nut and pea—while the under sizes go separately to four Wilmot Hydrotators. From a 10x10x110-ft. horizontal settling tank, the silt is fed to a 16-ft. Wilmot classifier to recover No. 5 buckwheat. Ash contents of the shipments of buckwheat, rice, barley, buckwheat No. 4 and buckwheat No. 5 are brought down to the following percentages, respectively: 10.5, 11, 11.5, 12 and 13.

Brief mention was made of a new froth flotation plant used by the Lehigh Navigation Coal Co. to recover 40 tons per hour of 14-mesh and minus coal. Ash reduction in the larger fractions is from 12 to 14 percent down to 8 to 10 percent, while in the minus-100-mesh the reduction was from 22.9 down to 21.74 percent.

Mr. Lesser stated that in the twenty years from 1924 to 1944 shipments of anthracite steam sizes increased 50.7 percent and the prices increased 64.1 percent. He outlined the following changes or developments that have increased the uses of small anthracite: boiler settings built to burn pulverized No. 4 and No. 5 buckwheats at an efficiency of 80 percent, briquettes, blending with coking coals, packaged "White Glove" fuel and pelletized slurry from a Dorr thickener.

Briquettes have been made on a small scale for 25 years but in 1944 the production was 1,400,000 tons. In 1945, a large anthracite producer decided to build two briquetting plants with a combined capacity of 2,000 tons daily. In 1944, tonnage of anthracite small sizes blended with coking coals was 200,000. The packaged and pelletized anthracites are new developments. A plant for the packaging was placed in operation recently in the Philadelphia area and successful tests in burning pelletized anthracite on chain grate stokers were made within the last two months.

Average productions per unit and per face man for several mechanical mining methods in 34- to 44-in. seams were given by John J. Snure, assistant production manager, Rochester & Pittsburgh Coal Co., Indiana, Pa., in a paper on "Mechanical Mining in Thin Seams." Opening the Tuesday-morning deep-mining session with Frank G. Smith, Sunday Creek Coal Co., Nelsonville, Ohio, as chairman, Mr. Snure emphasized the importance of good management and placed experienced and thoroughly trained maintenance above everything. Because it is impractical in low coal to move equipment from one section to another it is important to have spare equipment at all strategic points. He went so far as to mention the possibility that there should be spares for everything that directly controls production. In conveyor work (six to eight conveyors per belt), an extra conveyor set-up is carried and highly trained moving crews of five to eight men move conveyors on shift.

Mr. Snure said that the shortwall loader, although not well known and not now being manufactured, is without competition so far as speed in concerned in developing thin seams. With three-men crews and two supply men, working double shift, three machines have driven three developing butts 1,100 ft. in one month.

Minimum outages and generally low maintenance are among the advantages of self-loading shaker conveyors. Eight face men produce approximately 150 tons per shift in developing a triple butt entry, the shakers discharging to a butt belt. In bringing back the panel with three 30-ft. rooms working on each side and with crews of four men per shaker, the 24 face men produce 420 tons. In higher and more favorable seams, these power duckbills, which move across the face under their own power, are producing 30 to 40 tons per face man.

Fifteen to 16 men (total for two shifts) developing a 2,200-ft. triple-heading butt entry in 36- to 44-in. coal with a caterpillar loader discharging to a 300-f.p.m. 30-in. belt get 240 tons. A crew consists of five face men (getting 24 tons each), a boom man, a mechanic and a half-time supply man. Besides the loader and belt, the principal equipment includes one mining machine, one caterpillar machine truck and one coal drill. On retreat from the panel

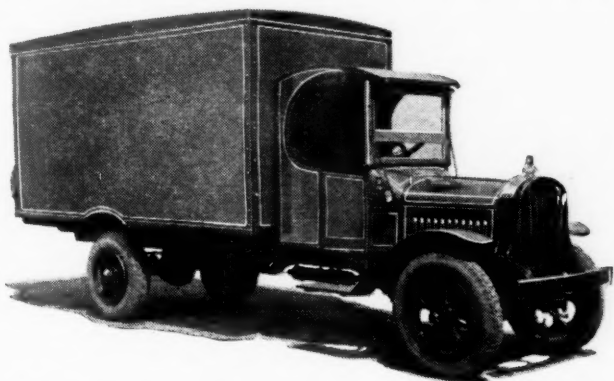
Half a Century of Truck Progress... A PICTURE HISTORY



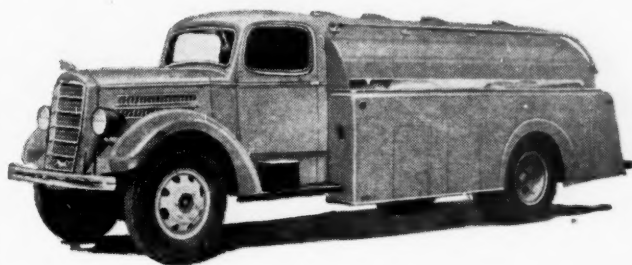
1906 The first Mack commercial gasoline vehicle was delivered in 1900. It operated as a bus and later as a truck for 17 years. By 1906, the automotive industry's tenth birthday, Mack trucks had many advanced features, including the "high cab" (above), granddaddy of today's cab-over-engine design.



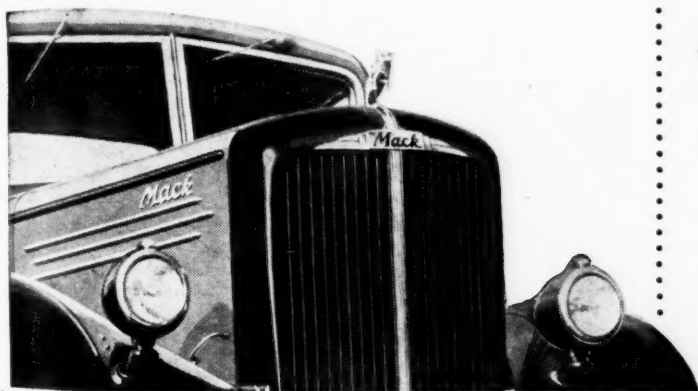
1916 Ten years later came the famous AC "bulldog" model which made the phrase "built like a Mack truck" a popular synonym for rugged strength. You can still see many of these trucks grinding along through city streets, steadfastly making money for their owners and looking quite at home in modern traffic.



1926 More powerful engines were being used, and by 1926 pneumatic tires were fast displacing solids and making possible greater road speeds. These progressive trends, plus certain exclusive refinements of Mack engineering, were embodied in the Mack AB.



1936 An important milestone in truck history was the introduction, in 1936, of the now widely-used Mack EH—a model which surpassed anything previously attained in truck performance.



1946 Today, with World War II experience crowning its 46 years of production, Mack again takes the lead in building the world's hardest-working trucks... trucks which set industry standards for stamina, performance, economy and long life.

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PERFORMANCE COUNTS!

with three loaders working 28-ft. rooms, the production is 18½ tons per man in the section.

In higher coal—40 to 42 in.—in a similar setup with a butt belt using a higher-capacity loading machine and two shuttle cars, ten men on the section in advance work produce 200 to 250 tons. On retreat with two loaders working four rooms on each side 25 men produce 650 to 750 tons. Seven to 14 man-hours are expended throwing back the larger lumps from 5 in. of top bone which, for the most part, comes down when the coal is shot. Studies have shown that by addition of one driver and one shuttle car, thus using three shuttle cars per loading machine after rooms are past the first cross-cut, production can be increased 12½ to 15 percent.

T. E. Costner, general superintendent, Sloss-Sheffield Steel & Iron Co., Alabama, in a discussion of Mr. Snure's paper, said that of the three mining systems the one using shortwall loaders appears most favorable. He said that seams 34 to 44 in. in thickness are hardly termed thin seams in Alabama. In that state, a lot of coal is mined from seams 24 in. and thinner and one mine, normally in 21- to 22-in. coal, ran a month in coal averaging 17½ in. That mine, cutting in the fire clay below the coal and using chain conveyors, produced only 1.3 tons per man-shift.

Maintenance Discussed

In a discussion of "Maintenance of Underground and Surface Equipment," William Burnett, Jr., electrical engineer, Peabody Coal Co., Chicago, brought out the latest trends while treating the general subject in the following six divisions: (1) organization, (2) ways and means of doing work, (3) determination of degree of perfection to which equipment is to be held, (4) maintenance procedure, (5) the problem of lubrication to insure long life and (6) manufacturer's responsibility before and after equipment is delivered to customer.

There is a tendency now to have specialists for each type of work since no one person can know all the maintenance. The supply man is one of the most necessary persons on the force of the chief electrician—he is responsible for ordering parts necessary to have on hand. Although certain specialized types of mechanical and electrical jobs are being sent more and more to outside shops, the central shop is a necessity and is an ideal place to train men for taking the underground maintenance jobs. The central shop should not be a production center for repair parts. It should not be at a mine property and not under the control of a single mine.

The underground maintenance man, said Mr. Burnett, should be a fitter or connector of assembled units only. An example of the trend in this direction is a mine locomotive practice of changing whole motor assemblies rather than changing armatures only. For mine lubrication, he sees the need for packaged oil in tin containers of 1-qt. to 3-gal. sizes. Manufacturers' service men, held in high esteem by the mine maintenance men, receive negligible consideration from the manufacturers' engineering department. Mr. Burnett suggested that the designing engineers be required to do a stint as service men.

The importance of the manufacturers serv-

MEETINGS

• **Mineral Producers Association:** annual meeting June 21, William Penn Hotel, Pittsburgh, Pa.

• **Illinois Mining Institute:** summer meeting on steamer "Golden Eagle," leaving St. Louis, Mo. Friday, June 21, 10:30 p.m. and returning to St. Louis Sunday morning, June 23.

• **Southern Appalachian Industrial Exhibit:** sponsored by the Pocahontas Electrical and Mechanical Institute, Aug. 22, 23 and 24, Bluefield, W. Va.

• **American Institute of Mining and Metallurgical Engineers:** 75th anniversary meetings, Sept. 16-18, Waldorf-Astoria Hotel, New York City.

• **Joint Fuel Conference of the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers:** Oct. 24-25, Bellevue Stratford Hotel, Philadelphia.

ice men also was emphasized by J. F. Mazza, superintendent of maintenance, Rochester & Pittsburgh Coal Co., Indiana, Pa. He advised giving the service men plenty of help and grasping the opportunity to learn from them. His company is trying with success packaged lubricants to the extent that they are being purchased in 50-gal. drums and sent into the mine in 2-gal. cans. Top management's interest in maintenance is very important, because that attitude is reflected right on down. Mechanically inclined foremen should be given the same training as maintenance men. The chief electrician and his mechanics should be sent to the manufacturer's plant as a part of their training.

Maintenance, said D. W. Jones, president, Simpson Creek Collieries Co., Clarksburg, W. Va., can be budgeted if a cost per ton is established for the deferred maintenance and money appropriated ahead, thus avoiding investigations and the explanations of idle-day and other unusual expenditures that the chief electrician would otherwise be called upon to make.

Using slides with his paper, "Mechanical Mining in Thick Seams," George R. Higinbotham, production manager, Consolidation Coal Co., Fairmont, W. Va., showed a new mining plant at a Pittsburgh-seam mine in the Fairmont field which is proving efficient for shuttle-car work. Places are driven 14 ft. wide on 70- and 116-ft. centers. The 50x102-ft. blocks are extracted in four separate lifts. Development is only three or four crosscuts ahead of the pillar line. Consequently, the roof does not have time to develop trouble, as indicated by the fact that 180,000 tons of coal were taken out of a section with only six cars of slate handled due to falls of roof. Eighteen men on a section with one loading machine produce an average of 450 tons.

Of the 17,000 tons mined for each set-up

of the elevating conveyor, 10,000 tons comes from pillar blocks and 7,000 tons from solid work. Timber cost is about one-third of the total mine-supply cost. To reduce length of the shuttle-car haul (cable-reel cars) the plan is to install a 400-tons-per-hour belt of a portable nature in each line of crosscuts, moving it about every two weeks. Dumping will be over the sides of the belt as well as over the end—ten dumping points in all. Perfect alignment of the pillar line must be maintained even to keeping the splits of the pillars in step. As soon as a split is finished the timber is pulled and a fall produced. Each shift sets and pulls its own timbers.

Successful pillaring in the Fairmont field, to which Mr. Higinbotham confined his paper, depends, he said, on rapid extraction, which requires high capacity, high concentration and multiple shifting. The latter complicates the supervisory and maintenance jobs. Having extra equipment and doing complete rebuilding jobs after definitely established lengths of service should lick the maintenance problem. Mr. Higinbotham's paper included a brief review of mechanical loading progress from the beginning in the field.

In discussion, R. L. Adams, general superintendent, Old Ben Coal Corp., Illinois, told of a new mine being developed in that field using 7-ton cable-reel (600-ft. cable) shuttle cars, 7-ton mine cars and 7-ton skips so that there is no measuring into skips. Two shuttles will be used per loading machine as soon as room depth justifies. Without transfer stations each shuttle car will deliver directly to the mine car at the mouth of each room.

Mr. Adams said that in the Illinois No. 6 seam, where the cover is 400 to 600 ft., pillar drawing has not been developed to any extent because a break cannot be controlled but instead it rides over. Shearing in that seam is not desirable with Cardox shooting because it results in oversized lumps.

Track equipment, said E. H. Johnson, chief engineer, Republic Steel Corp., is preferable in the Pittsburgh seam of the Pennsylvania field in localities where lack of height requires that head coal be taken down and the drawslate loaded. Shuttle cars do better where no slate is handled. For three-shift operation, he suggested spare equipment ratios of 1 to 4 or 1 to 5 as being about right.

Modern Mine Organization

R. E. Salvati, vice president, Island Creek Coal Co., presenting a paper on "Modernizing the Mine Organization," at the Tuesday-afternoon deep-mining session, with R. E. Kirk, Tennessee Coal, Iron & R.R. Co., Birmingham, Ala., presiding, set forth for top management a number of suggestions under seventeen heads, which suggestions, he indicated, were worked out for the most part by a committee of the Southern Coal Producers' Association of which he was chairman. These heads are: (1) supervisory-executive relationship, (2) methods of payment of supervisors, (3) establishing a proper channel for routing grievances upward, (4) establishing a proper channel for routing company policies downward, (5) suggestions for supervisors, (6) thoroughly acquainting foremen and supervisors with their duties and



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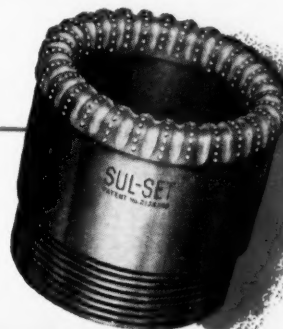
The Sullivan 22HD is a modern, heavy-duty, high-speed drill that will core to a depth of 1750 feet, regardless of the material drilled, and do it swiftly and accurately at low cost either on the surface or in the mine. Its compact design and modern alloys insure maximum portability and comparatively light weight. The 22HD is safer, too! An exclusive feature is the hand-lever operated jaw clutch that allows the drill runner to stop the rotation of the beveled-gear drive in the swivelhead—thereby eliminating the hazard of an exposed, positively-driven gear when the swivelhead is open while running or pulling rods. No other core drill of equal capacity offers all the advantages found in the 22HD. Many other types and sizes of core drills available. Sullivan core drills are offered either for outright sale or by contract on a price per foot basis. For details see your nearest Sullivan office or write for Bulletin D-28. Sullivan Division, Joy Manufacturing Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

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responsibilities, (7) management's definite support of foremen in the discharge of their duties, (8) management assistance to foremen in establishing their own authority and prestige with the men, (9) regular business meeting of supervisors, (10) vacations with pay, (11) definite method for selecting candidates for supervisory jobs, (12) definite training program, (13) executive management should provide through channels for adequate presentation, consideration and adjustment of individual problems by any member of the supervisory force, (14) the selection or retention of individuals for supervisory positions should be governed by seniority rules and practices, (15) provisions should be made to bring foremen in contact with top management as often as possible, on both a formal and informal basis, (16) social and recreational activity suggestions and (17) consultative supervisory relations and morale.

Mechanical mining, said Mr. Salvati, brought onto the scene specialists like the personnel director, safety man and time-study engineer thus detracting from the foremen's authority and prestige. The foreman resents it and wants a job with responsibility. The solution of his problem is irrevocably tied to the problem of efficiency and production. The foreman cannot serve two masters and so must not be lost to unionization.

Carel Robinson, consulting engineer, Charleston, W. Va., declared in discussion that many companies have made a mistake by relieving the foremen of many of their duties upon the introduction of mechanical mining. In many instances, management must be modernized before new machinery is installed. Often the foremen must be changed from an hourly rate to a monthly rate and given substantial pay increases. It is foolish to install machinery faster than men can be trained to use it. Furthermore, hiring a foreman trained in the methods at another mine is often disappointing.

"Safety Practices at the Union Pacific Coal Co. Mines," prepared by F. J. Peter-nell, safety engineer, was read by John B. Hughes, general superintendent, and illustrated with slides. Monthly safety meetings by districts and semi-annual general meetings constitute a principal way of creating a safety spirit. Although transportation is not furnished by the company to the safety meetings, the attendance is around 60 to 75 percent. Use of goggles by all employees is compulsory and all underground men must wear them from the time they enter the mine until they leave. Consequently, eye injuries are almost non-existent. All goggles, including those with prescription lenses, are paid for by the employees.

First-aid training is a fundamental requirement of the company. The company has its own instructors and every employee is required to pass an examination given by the Bureau of Mines. Men are not paid to take this training. Water from storage tanks on the surface is piped to all working places for sprinkling. Violation of a rule that cutting must not be done unless there is water on the bar subjects the employee to discharge.

Mr. Peter-nell's paper enumerated many safety practices under other heads including systematic timbering, adequate ventilation, haulage, rock dusting, mechanical and electrical inspection, handling of explosives, good

EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in April, as follows:

Joy Mfg. Co.—Type T2-5P caterpillar truck; two 4-hp. motors; and either 220, 400, or 440 volts, a.c.; Approvals 552 and 552A, respectively; April 1.

Joy Mfg. Co.—Type 5SC-3PD shuttle car, storage-battery type; three 7½-hp. motors; 90 volts, d.c.; Approval 553; April 23.

Joy Mfg. Co.—Type 42D17P shuttle car, storage-battery type; three 7½-hp. motors; 90 volts, d.c.; Approval 554; April 25.

American Mine Door Co.—Type U. S. rock-dusting machine; 20-hp. motor; 230 volts, d.c.; Approval 555; April 25.

Koehler Mfg. Co., Inc.—Type G single-shot blasting unit, storage-battery type; in combination with Wheat permissible electric cap lamps; Approval 1227; April 25.

housekeeping, discipline and supervision, mine rescue, safety instructions and general inspections.

C. R. Stahl, assistant to the vice president, Koppers Coal Division, presented a discussion consisting principally of questions on the subjects of pay for first-aid training and the extent of goggle use. Mr. Stahl observed that to maintain discipline the mines of his district now rely more on training and cooperation than on laying men off.

Underground Haulage

"Underground Haulage With Locomotives and Mine Cars," was presented by C. R. Nailler, general manager, Hanna Coal Co. and co-author with C. C. Hagenbuch, assistant to the vice president. Track-mounted haulage equipment, characterized as still being the most widely used method of underground transportation, can be operated as efficiently as any other system from the standpoint of production, they stated. Among the several advantages are lower first cost and greater flexibility.

New types of heavy, high-speed locomotives have been developed for main-line haulage. Drive units sealed in oil-tight housings, tandem hook-ups, eight-wheeled units and semi-automatic starting overcome shortcomings of the older locomotives and permit the use of heavy units in low seams.

For combination secondary and gathering, manufacturers are now offering 8- to 10-ton locomotives with cable reels operating at 5 m.p.h. on the reel and 6 to 8 m.p.h. on the trolley. Use of the one type of locomotive for both services provides for a minimum of spare equipment.

As a result of new perspectives by the coal operators and car manufacturers, it is now considered practical to use eight-wheeled cars up to 20 ft. in length and four-wheeled cars over 10 ft. long. Full-seam mining has

been a factor in raising the size of cars. These larger units cost less per cubic foot of capacity, have greater capacity per unit of weight and improve loading-machine performance.

Main-line tracks should have curve radii great enough so that trips will not be slowed materially and outside rails on curves should be elevated. In this permanent, high-speed construction, welded joints should be used. Maintaining a dry road is the most important factor in track maintenance. Adequate provision for drainage must be made at the time of installation and then cared for continuously.

Referring to track haulage, J. B. Haskell, manager of sales, West Virginia Steel & Mfg. Co., suggested that it might be wise to improve and enlarge a familiar system of transportation rather than invest in a new system that has not been proved. He stated that time has shown that some other forms of transportation are more affected by time and service than track. He emphasized the importance of drainage and upkeep of joints. On the problem of installing and removing secondary tracks, he said that reports from the field show better than a 50 percent reduction in track cost by using pre-fabricated track.

S. G. Hughes, vice president, Differential Steel Car Co., speaking for the car manufacturers, said that the greater the distance the greater the economy with track haulage and that expensive cleaning plants call for longer hauls. He suggested that many mine car parts could be standardized, thus reducing mine-car costs.

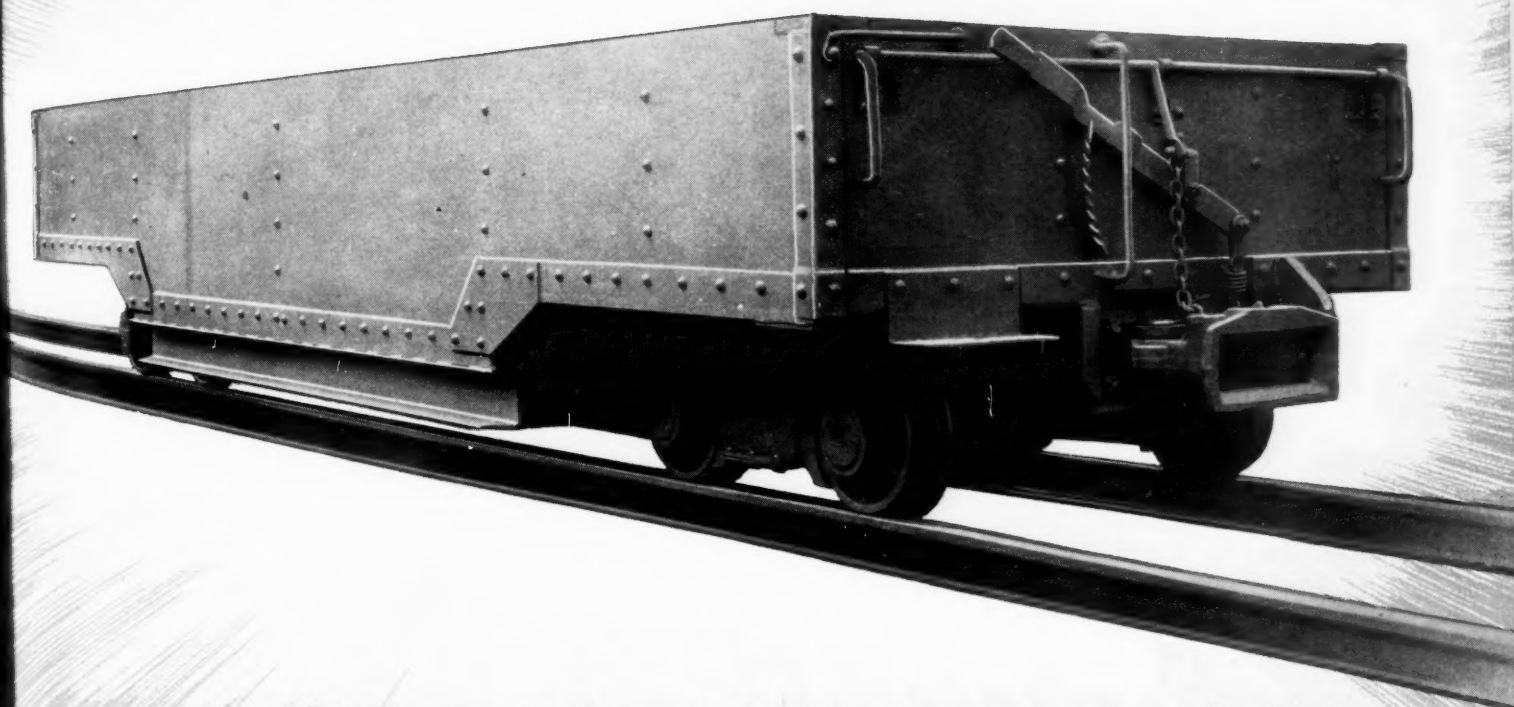
Instead of putting stress on the cost of haulage alone, said G. Stuart Jenkins, assistant general manager, The Consolidated Coal Co., St. Louis, they now base efficiency on tons per man employed. His company installed a trackless mine in 1937 but went too far and swung back to locomotives for the main line. The next step was shuttle cars dumping into large mine cars. Now, the best combination appears to be shuttle servicing, belt gathering on the panels and main-line car haulage over track that is rock ballasted and has welded rail joints.

Coal transportation cost is \$0.0262 per ton-mile with main-line underground belt, said Ray Cobb, superintendent, West Kentucky Coal Co., Earlinton, in a paper on "Underground Haulage With Belt Conveyors." In the absence of Mr. Cobb, the paper was read by J. A. Bottomley, preparation manager, Sahara Coal Co., and slides were used in the presentation. This cost figure, based principally on experience, was for a 42-in. belt working two shifts, carrying 1,500,000 tons per year and assuming a ten-year life for mechanical parts and belting. Percentage costs were given as follows: belting, 19; mechanical parts, 14; interest on the investment (5 percent), 6; operating cost, including power, labor and maintenance materials, 43. As to the belting itself, the paper stated that at that the company's mines main-line belts that have been in use 5½ years on two-shift operation show no appreciable wear.

The comparative ton-mile cost for 30-in. main-line belts having the same life and operating time but delivering only 600,000 tons per year is \$0.042. Percentages of total cost are: belting, 17.05; mechanical parts, including installation, 19.02; interest on the investment (5 percent), 9.92; and operating

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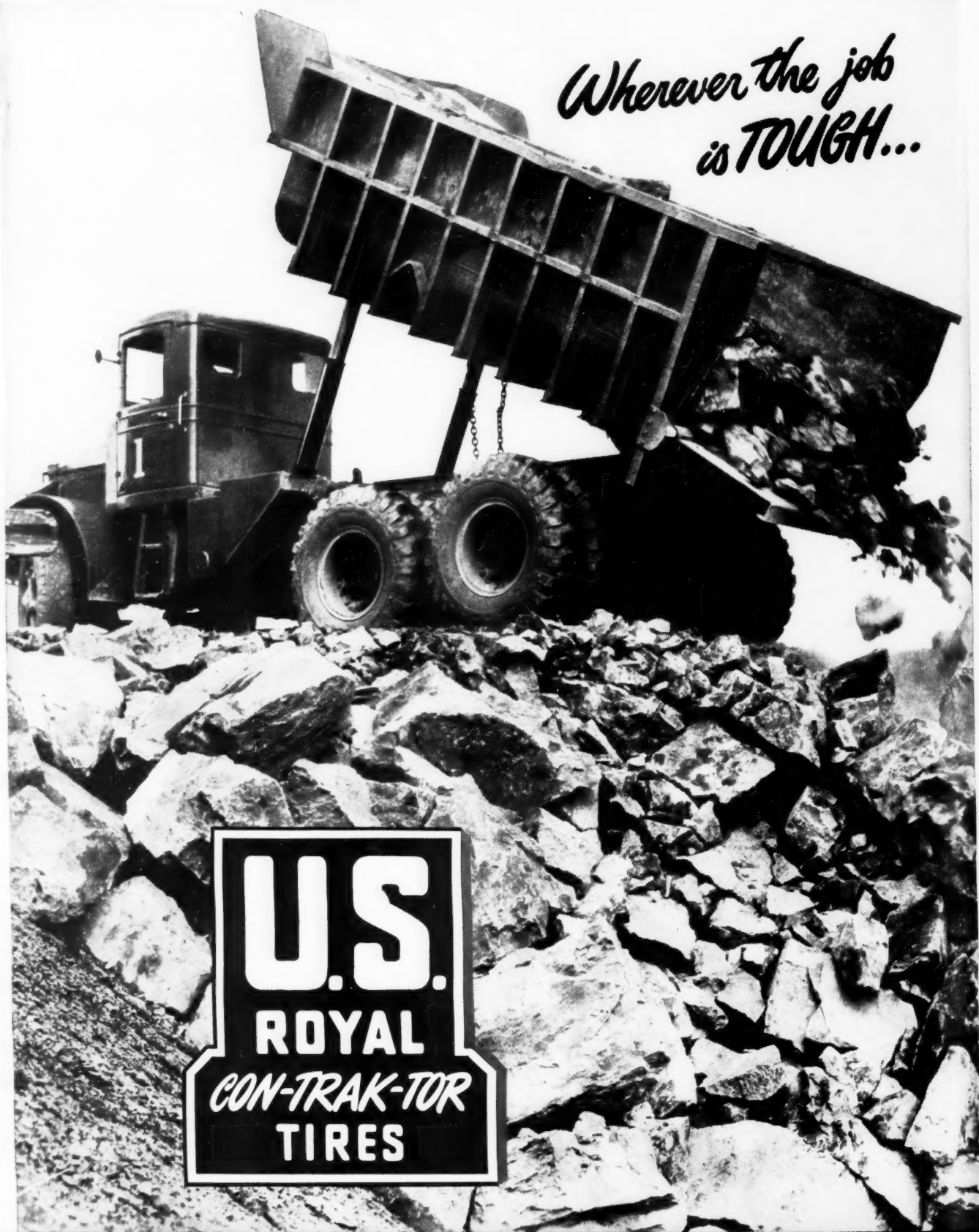
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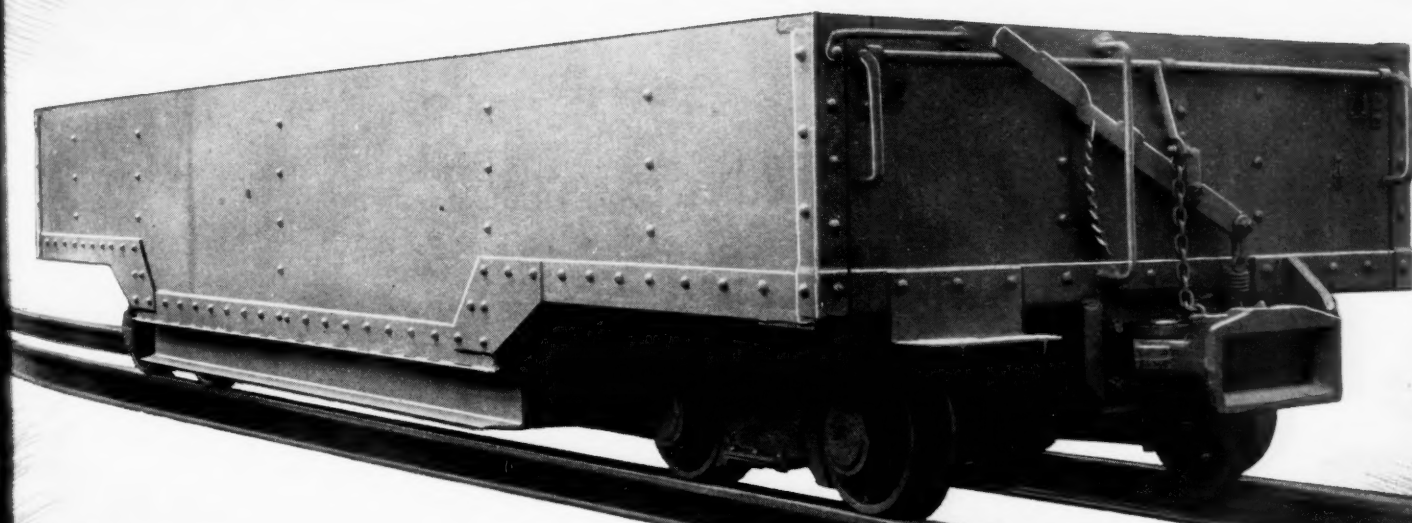
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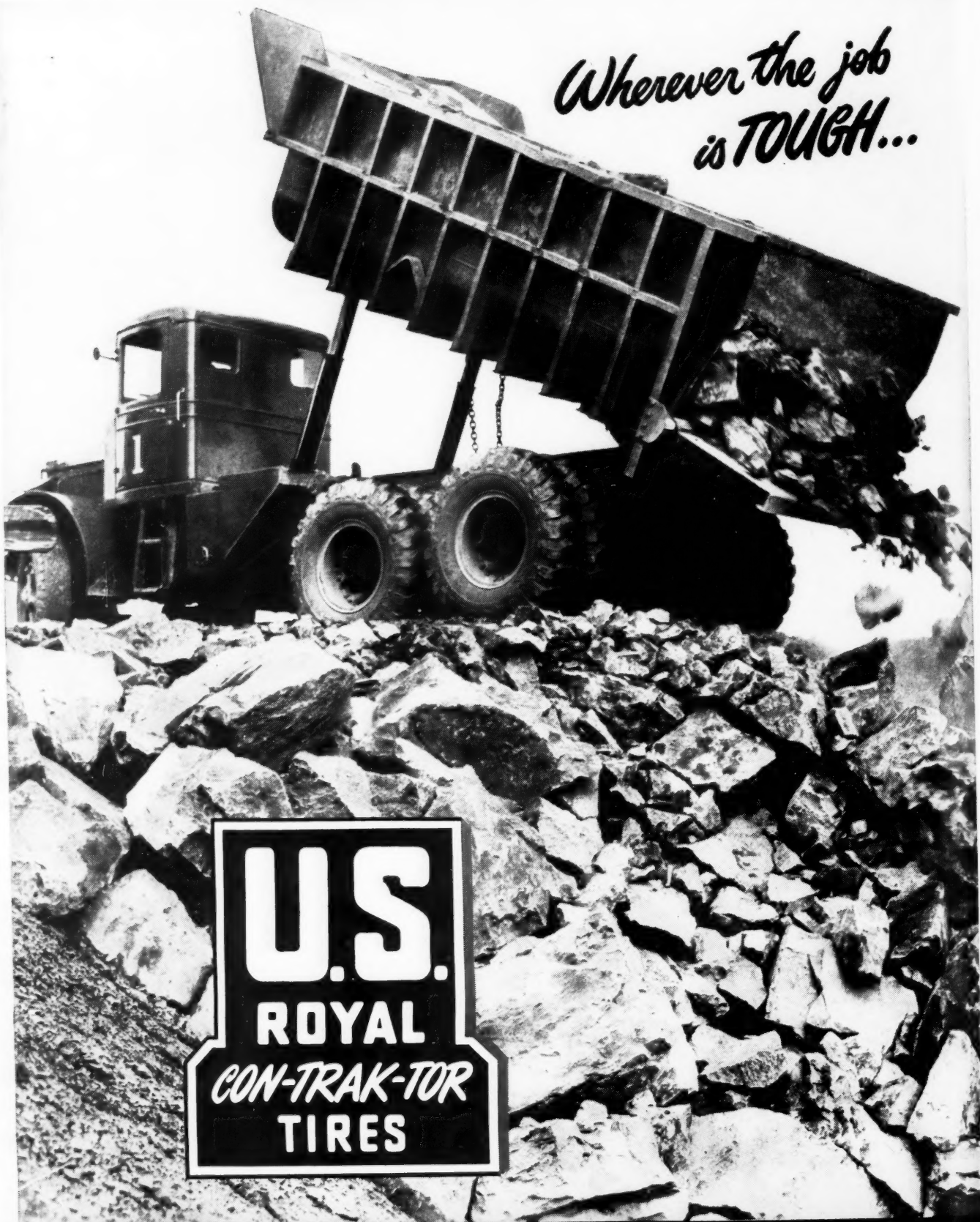
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cost, including power, labor and maintenance materials, \$4.01.

The ton-mile cost for a room-entry belt is \$0.0319. This is based on a unit 1,500 ft. long, three moves per year, ten years life for the mechanical parts and 5½ years life for the belting. In this case, percentages are as follows: belting, 19; mechanical parts, 14; interest on investment (5 percent), 6; operating cost, including power, labor and maintenance materials, 43.

The West Kentucky Coal Co., working 4½- to 6-ft. seams, has operated three full-conveyor-haulage mines since 1940 and is now completing the development of a fourth. Belts are 30-in. except that the North Diamond mine has one mile of 42-in. Maximum length of belt haulage is 10,000 ft. and maximum length of a single section of belt conveyor is 2,500 ft. The latter is in North Diamond mine and is powered by a 125-hp. motor. Speed is 500 f.p.m. and the maximum loading about 800 tons per hour.

Discussing the paper, R. S. Bigelow, manager of the foreign department, Goodman Mfg. Co., called attention to the tendency for speeds lower than 500 f.p.m. in low coal as a result of carrying men and supply materials on the belt. He recalled that only 185 man-hours were expended in moving a 1,000-ft. belt conveyor and the shaker-conveyors of a section in a mine of the Pacific Coal Co. in western Kentucky.

When permissible belt units are used, the entire control system is simplified. Each inby belt is sequence started by a switch actuated by operation of the tail end of the outby section of conveyor, thus saving a lot of control wiring. Mr. Bigelow also called attention to the short reversible chain conveyors now available to be suspended from the roof at belt discharge points so there need be no stopping to change cars and no spillage.

Strip-Land Conservation

Conservation and reclamation of stripped-over lands was the theme of the Tuesday-morning strip-mining session. A public-spirited venture in its beginnings, restoration of disturbed lands by reforestation, grassing and cultivation has become a profitable enterprise, said Hugh B. Lee, vice president, Maumee Collieries Co., Terre Haute, Ind., who presided.

Cooperation between the Indiana Coal Producers' Association, the Indiana Department of Conservation and the Indiana Farm Bureau in drafting legislation to govern revegetation of stripped lands was described by L. E. Sawyer, director of forestry and reclamation, for the association. He outlined planting and seeding, soil tests and adaptation of mined-over lands to grazing, lumber and walnut production and recreation, including hunting, fishing, swimming and picnicking. This reclaimed land is producing more for future generations than most of it was capable of producing before the coal was removed, he asserted.

Conversion of depleted strip lands in Illinois from unsightly tax liabilities to income-producing assets was traced by J. W. Bristow, secretary-treasurer, Illinois Coal Strippers' Association. Quickest and largest returns are yielded by lands converted to stock range and when spoil ridges are topped out with clay or other sweet or natural soils, the speaker

said. "Sweet and red clover, timothy, blue grass, red top, brome and alsike clover grow stronger, remain green longer and are more nourishing than on land not previously subjected to surface disturbance," Mr. Bristow pointed out. Three conclusions were drawn by the speaker: (1) restoration of stripped-over lands for forests, grazing and recreation is possible but is a complex land-management problem for experts; (2) every property should be studied individually and developed on its own merits; (3) leveling spoil ridges does not add to the value of disturbed land.

The dangers of regulatory and punitive legislation aimed at strip-mine operators were cited by R. T. Laing, executive secretary, Mineral Producers' Association of Pennsylvania. Less than 1 percent of the land in any state is adapted to profitable stripping. Laing declared in emphasizing reclamation projects already undertaken voluntarily by Pennsylvania operators. The speaker laid down eight recommendations: (1) tops of spoil banks should be knocked off to facilitate harvesting; (2) soil should be moved as little as possible; (3) land should be allowed to settle about a year before being cultivated; (4) expert advice should be sought on suitable trees and grasses; (5) return of land to its original contour is expensive and the advantages are doubtful; (6) any legislation that is adopted should be directed at all surface-mining operations, not at coal strippers alone; (7) operators should be responsible for reclamation of their own lands; and (8) a study of community needs should be made before treatment of the land is decided upon.

Extensive discussion of the three Tuesday morning addresses took place before the noon recess. James Hyslop, vice president, Hanna Coal Co., St. Clairsville, Ohio, traced the history of legislation now pending in Ohio and summarized the Ohio strippers' program, which includes opposition to all regulatory legislation because of the danger of further encroachments in the future, collaboration with associations and operators in other states for unified action, the winning of public favor by extensive voluntary reclamation and the maintenance of good public relations by employment of expert public relations counsel.

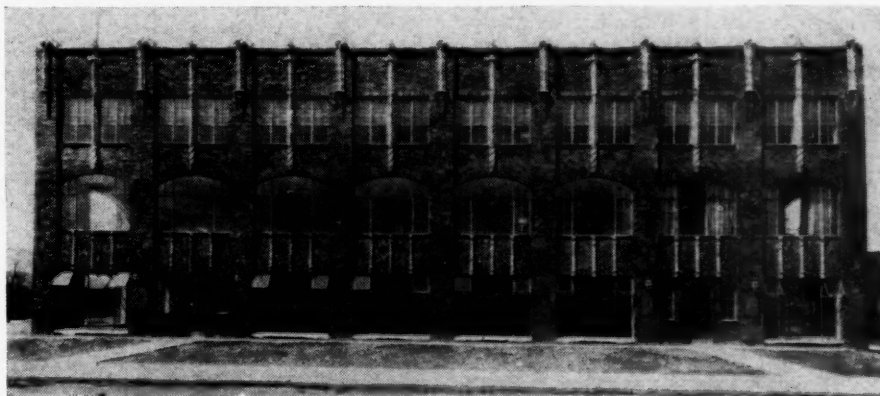
Comment on the morning address was continued by T. C. Cheasley, secretary, Missouri Coal Operators' Association, who described the agreement of Missouri operators to back conservation recommendations growing out of a joint study with the farm bureau and government experts. Byron Somers, superintendent, Red Ember Mine, Truax-Traer Coal Co., Fiatt, Ill., summarized profitable farm operations on reclaimed land and pointed to a net income of \$7.00 per acre on areas reclaimed for grazing. Mr. Somers observed that grassed areas of stripped-over properties can pasture twice as many cattle as old grazing land. R. H. Swallow, chief engineer, Ayrshire Collieries Corp., Indianapolis, Ind., described his company's subsidiary organized specifically to take over farming operations, including fruit-growing and hog- and cattle-raising under supervision of expert farmers.

Strip-Mining Equipment

Equipment and technique for strip-mining keynoted Tuesday afternoon's strip session, presided over by T. G. Gerow, vice president, Truax-Traer Coal Co., Chicago. Wide-spread use of large-size low-pressure truck tires was forecast by J. G. Berry, field engineer, United States Rubber Co., Detroit, Mich. Wire fabric, replacing textile fabric in tires and belts, will serve as a heat conductor and prevent local heat spots. Shovel and dragline equipment soon may be mounted on tires and rubber tracks for crawler equipment may make high-speed operation possible in the future, declared Mr. Berry in describing projects being developed by U. S. Rubber engineers.

"The major impetus to the use of progressively larger stripping machines has come in recent years from increasing labor costs and increasing stripping ratios," declared R. M. Dickey, sales engineer, Bucyrus-Erie Co., Chicago, who discussed factors likely to govern future developments in the use of dragline excavators. These factors are: (1) space limitations of the strip pit, (2) availability of repair facilities as parts become greater in size and weight, (3) the nature of the overburden, (4) costs of bank preparation as the stripping ratio increases, (5) availability of large blocks of strip-coal acre-

New Headquarters for Anthracite Institute



The Martz Building, Wilkes-Barre, Pa., has been purchased as a new headquarters and laboratory, the Anthracite Institute recently announced. The building provides more than twice the space available in the Institute's present laboratory at Primos, Pa., and all research and laboratory facilities will be consolidated in the new headquarters, it was said.

ages, (6) legislation aimed at increasing costs and (7) increasing labor costs and stripping ratios.

The respective merits of draglines and shovels were discussed by L. C. Moseley, manager, Marion Power Shovel Co., Marion, Ohio, who declared that under equal conditions shovels can be operated at lower cost than draglines. Mr. Lee observed that his company had found shovel and dragline costs comparable but that draglines offered advantages in mobility, long repair intervals and versatility. J. Robert Bazley, president of the company bearing his name, Pottsville, Pa., urged that each stripping operation be studied individually to determine the most practicable machinery and cited instances of new operations now in progress on land already stripped once and sometimes twice. Mr. Cheasley called attention to new research now under way in drilling and blasting methods.

Special problems and techniques in removing two seams in one operation were described by Clayton G. Ball, Paul Weir Co., Chicago, who read a paper prepared jointly with R. Paul Mauger, Mauger Construction

Co., Columbus, Ohio. Removal of overburden above the upper seam and between two seams, separate handling of the two coals extracted, maintenance of roadways and schedules for haulage, integration of a number of operating steps in the total sequence and adequate supply and distribution of power were cited as major problems in this successful operation.

Present developments and future prospects in plastics were described by Edwin E. Woodman, Durez Plastics & Chemicals, Inc., Chicago, at the Monday luncheon. Use of atomic energy to produce power in large plants about 30 years hence was forecast by A. L. Hughes, professor of physics, Washington University, St. Louis, Mo., who spoke at the luncheon on Tuesday.

Immediate action and widespread public education to forestall further government interference with freedom of opportunity and to prevent minority rule by labor leaders were urged by Warren Whitney, manager, National Cast Iron Pipe Division, John B. Clow & Sons, Birmingham, Ala., who was guest speaker at the annual dinner Tuesday night in the Hall of Mirrors.

equipped with six roller-bearing wheels and rides on two 1½-in. locked-coil cables set on a 60-in. gage and supported by towers.

At the Glen Lyon colliery of the Susquehanna Collieries Co. the refuse, 14 percent of the raw product, is hoisted in 10-ton gunboats up a long incline on a nearby mountain and discharged into a bin. From the bin, a larry and trailer haul the refuse out to the dumping point. The larry unit, operating on grades up to 7 percent, employs dynamic braking to reduce the number of brake-shoe replacements.

The answer to the refuse problem at the Oak Hill Colliery of the Philadelphia & Reading Coal & Iron Co. (Coal Age, November, 1945, p. 103) was a four-unit larry train. The problem was attacked from three angles: (1) a continuation of the 3-percent grade involving the purchase of new equipment; (2) a belt-conveyor system which called for some new equipment and the use of part of the old equipment; (3)

Refuse Disposal Discussed At A.I.M.E. Anthracite Meeting

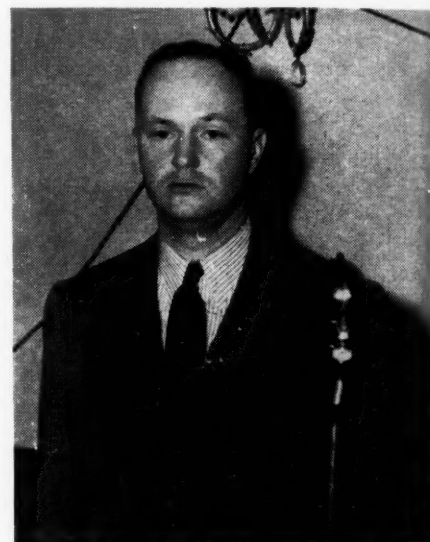
THE ANNUAL SPRING MEETING of the anthracite section of the American Institute of Mining and Metallurgical Engineers, held in Pottsville, Pa., May 4, featured as guest of honor L. S. Cates, president, Phelps Dodge Corp., and president of A.I.M.E. for 1946, who discussed the Wagner Labor Act as it pertains to the mining industry and the implications of rulings of the War Labor Board.

George J. Clark, chief engineer of the Shen-Penn Production Co. and former division engineer of the Philadelphia & Reading Coal & Iron Co., read a paper on "Methods of Disposal and Handling Refuse at Anthracite Mines in Eastern Pennsylvania."

Mr. Clark described several refuse-disposal installations scattered over the anthracite region. At Hudson's Eddy Creek colliery, in the northern field, a three-way larry operates on a grade of 40 percent. An electric hoist pulls the larry up the incline and at a set position the larry is caused to dump, using air from its own receiver. As the car is lowered to the loading chute, the dump bed automatically settles back in the traveling position. At the loading chute, the air receiver is automatically recharged. Thirty-inch belts and shuttle conveyors are used at the Marvine and Pine Ridge collieries of The Hudson Coal Co. to dispose of mine rock and breaker refuse after it has been crushed to 8 in.

The aerial tramway at Glen Alden Coal Co.'s Huber colliery, the first aerial disposal system in the anthracite region, came in for its share of recognition. Motor-truck haulage and belt conveyors were first proposed but the aerial tramway was chosen because it was almost the only way of crossing the 25 tracks of the Jersey Central and the two tracks of the Lehigh Valley R. R. where railroad cars are yarded prior to movement on the Ashley planes. The conveyor-type or continuous-carrier tramway, which moves

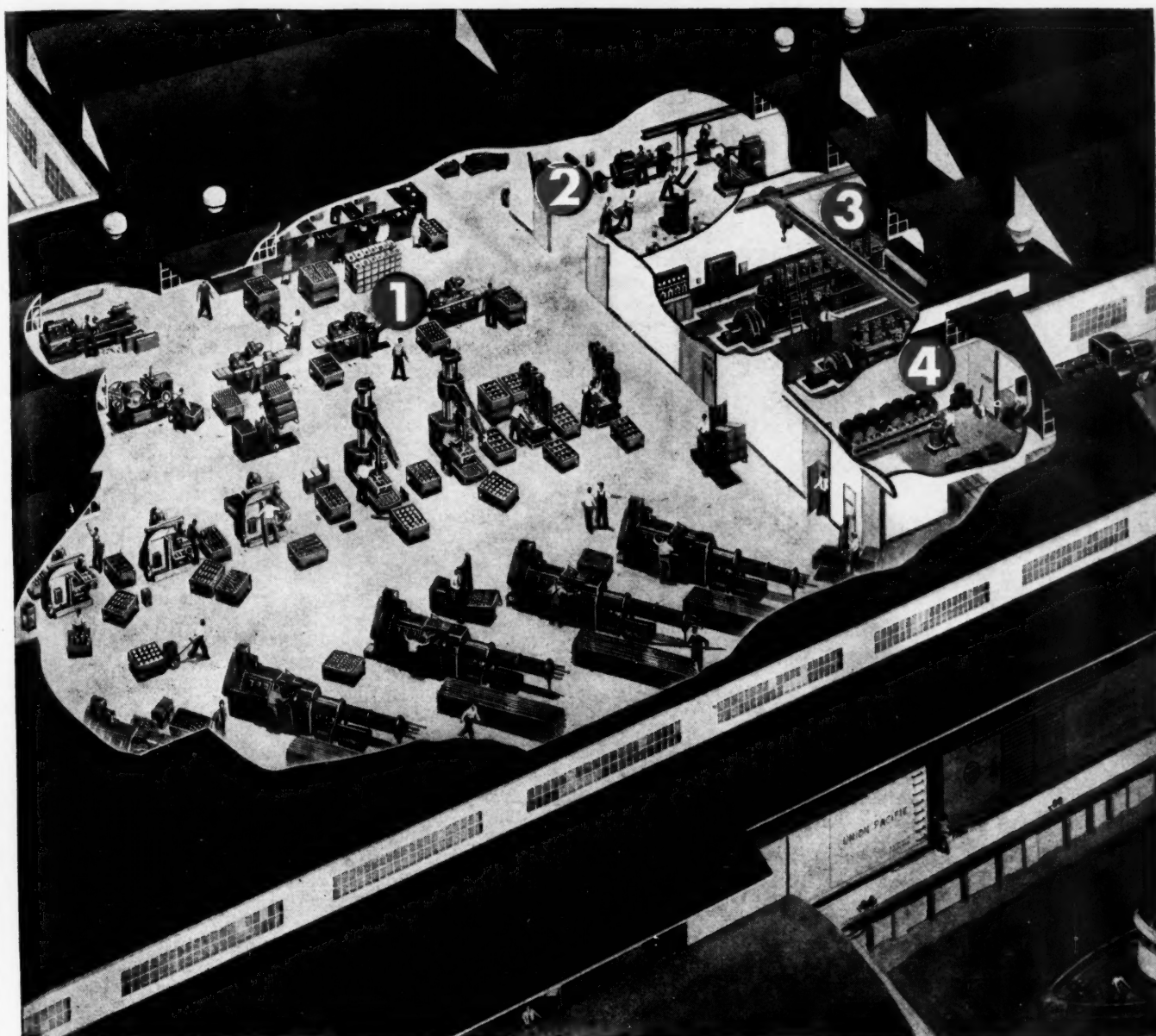
the refuse from the colliery and across the tracks to a transfer tower, consists of 22 four-wheeled shallow cars, or carriers, of 22.4-cu.ft. water-level capacity, traveling at wide intervals on two 1½-in. locked-coil cables which act as rails. These cables are supported at intervals by steel towers. At the transfer terminal, the continuous-carrier tramway discharges the refuse into a 2,500-cu.ft.-capacity cylindrical steel bin with a conical bottom. Two diverging two-car tramway systems leading to separate refuse dumps take the refuse from the transfer terminal and dispose of it. Each car, with a water-level capacity of 100 cu.ft., is



George J. Clark, chief engineer, Shen-Penn Production Co., whose paper on refuse disposal highlighted the meeting.



Among those attending the A.I.M.E. meeting in Pottsville were: (left to right) R. E. Taggart, president, The Philadelphia & Reading Coal & Iron Co.; L. S. Cates, president, Phelps Dodge Corp., and A.I.M.E. president for 1946; and W. C. M. Butler, chairman of the Anthracite section.



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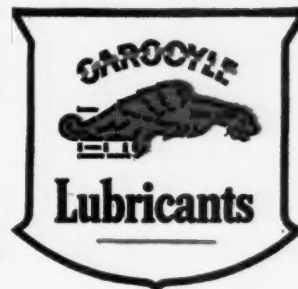
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a complete larry-train installation with the attendant power equipment to enable it to negotiate long grades of 10 percent or less. The third plan considered, which proved to be the logical choice from the standpoint of labor and equipment costs, involved the purchase of a four-car larry train capable of making 10 m.p.h. on a 10-percent grade, a new rectifier unit substation and building, and heavier track and trolley line construction. Aside from being the most economical means of meeting the problem it was a solution for a 20-year period.

Mr. Clark closed with a description of the refuse-disposal method in use at the Coaldale colliery of the Lehigh Navigation Coal Co. where two 40-ton side-dump cars are pushed up a heavy grade by a steam locomotive.

Several prominent colliery engineers of the region collaborated with Mr. Clark in gathering the material for the paper.

Potter Awarded Medal for Merit

President Truman has conferred on Dr. Charles J. Potter, formerly Deputy Solid Fuels Administrator and now associated with the Rochester & Pittsburgh Coal Co., the Medal for Merit for "Exceptionally meritorious conduct in the performance of outstanding services to the United States." The decoration was pinned on Dr. Potter by Secretary of Interior J. A. Krug in Washington May 9.

The citation in part stated, "As Deputy Solid Fuels Administrator, Dr. Potter formulated and directed the fuel distribution program which enabled the American anthracite and bituminous coal industries to fill every military and essential civilian requirement during the war. Under Dr. Potter's inspiring leadership, the unprecedented domestic and foreign demands for American coal production were successfully met, despite great difficulties and without interruption of industrial operations or hardship to consumers. As the head of the Potter-Hyndley Mission to northwest Europe, his investigations and recommendations laid the basis for the fuel policies and program of the Allied Governments in the devastated countries."



In Secretary of Interior Krug's office after the presentation of the Medal for Merit decoration to Dr. Potter are, left to right: Secretary Krug; Dr. Potter; Heath S. Clark, president, Rochester & Pittsburgh Coal Co.; George A. Lamb, associate director, U. S. Bureau of Mines and Dan H. Wheeler, deputy solids fuel administrator.

Retailers Endorse Coal Heating Service

Retail coal merchants approved the National Coal Association's new Coal Heating Service plan to help them retain and expand present coal markets and assured it their financial and moral support in a two-day business session in Washington May 9-10 with the marketing committee of the association.

The meeting, called for the express purpose of obtaining retailer reaction toward the new plan, was opened by John D. Battle, executive secretary of the association. Fred S. McConnell, president, in welcoming the retailers, expressed the hope that from the conference would come ideas for the kind of cooperation between shippers and retailers that the industry needed to make it healthier and more prosperous.

B. R. Gebhart, chairman of the marketing committee, outlined the studies made by the committee and explained the Coal Service Heating plan in detail. At his suggestion the retailers set up committees for detailed consideration of the plan, later reporting back to the full conference on their discussions. Suggestions and advice obtained from the conference will be incorporated in the final plan to be announced to retailers at their various regional meetings.

Expansions Proposed For Natural Gas

The Mississippi River Fuel Corp., St. Louis, Mo., has applied to the Federal Power Commission for authority to construct additions to its present pipelines that run from Perryville, La., into Illinois with St. Louis as their principal market. The new facilities would cost an estimated \$11,574,000 and would increase present capacity by 50,000,000 cu.ft. to a total of 183,000,000 cu.ft. daily. Construction is planned to begin in September and is to be completed by the first of the year.

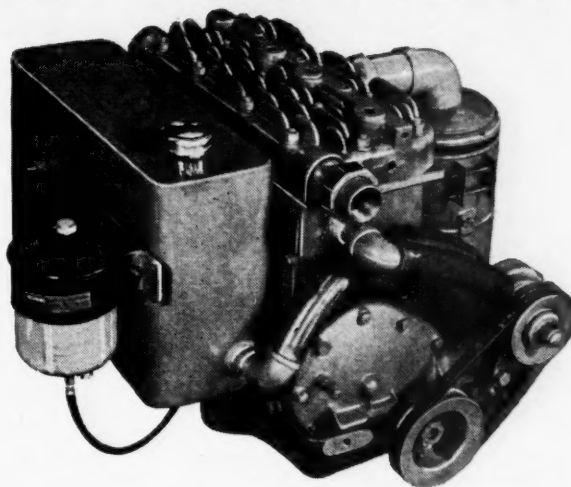
Support of Wisconsin public utility officials was given to the natural gas pipeline from Texas to Michigan and Wisconsin proposed by the Michigan-Wisconsin Pipe

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One of the outstanding, low-operating-cost advantages of a Cantrell air compressor is the Cantrell Factory Rebuilt compressor exchange plan. This exclusive plan permits you to replace your Cantrell compressor unit annually, if necessary, at only a fraction over \$7.00 per month. At this low cost, you can use this plan to advantage by simply ordering a replacement compressor, when needed, make the change over, within an hour, and return old unit for credit.

Whether it's for track or trackless mining, there's a Cantrell compressor, among our five models, to meet every mining requirement.



★ This Cantrell S-101 Compressor Assembly serves all Cantrell outfits. Sold separately as shown above for only \$348.00 F.O.B. Plant.

Cantrell COMPRESSORS



IMPERIAL-CANTRELL MFG., CO. JELICO, TENNESSEE



plenty of FRESH AIR too
for the men in your mine
simply through use of...

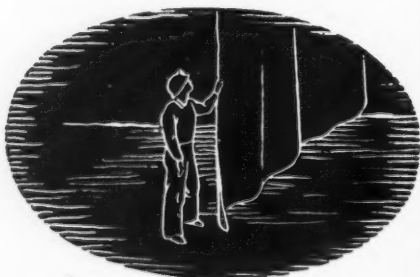
ABC JUTE BRATTICE CLOTH

• Well ventilated working places are assured because the many qualities of ABC JUTE BRATTICE CLOTH make it ideal for this type of service.

ABC Cloth is woven from heavy yarns and is skillfully and uniformly loomed throughout. Our research department has conducted many tests in the use of chemicals in treating the cloth to insure the very utmost in protection against the various forces that destroy ordinary type of cloths.

ABC is used in every coal mining section of our country assuring proper ventilation under every known working condition... a time proven brattice cloth—durable, flame resistant and easy to handle.

Write for complete details.



**AMERICAN
BRATTICE CLOTH CORP.**
WARSAW - INDIANA

Line Co. at hearings held last month in Detroit. The proposal calls for ultimate capacity of 400,000,000 cu.ft. daily, equivalent to 6,000,000 tons of bituminous coal per year.

A vast program to convert the District of Columbia to natural gas from its present use of both natural and manufactured gas, not expected to be completed until October, 1947, has been begun by the Washington Gas & Light Co. with the filing of applications with the Public Service Commission of Maryland and the Virginia Corporation Commission. Plans include tapping the Texas-West Virginia pipeline.

The Pennsylvania Anthracite Committee, set up originally by former Governor Arthur H. James to aid the industry, registered vigorous opposition in May to proposals to use the Big Inch pipeline for transportation of natural gas from Texas to the East. D. L. Corgan, committee secretary, announced that the committee had asked the Federal Power Commission for permission to intervene and estimated that between 8,000 and 10,000 miners would be thrown out of work if all of the 275,000,000 cu.ft of natural gas to be brought in displaced coal in these states.

Leatherwood Completes Temporary Tipple

Completion of the temporary steel tipple at the Leatherwood mine, Blue Diamond Coal Co., Leatherwood, Ky., has been announced by Alexander Bonnyman, president of the company. Moved from the company's worked-out Bonny Blue mine, Bonny Blue, Va., to serve in the opening of this large-scale producer (Coal Age, February, p. 113), this tipple will prepare 625,000 tons per year, based on one shift, five days a week, and its capacity could be upped to 1,000,000 tons yearly by double shifting should construction of the permanent tipple be delayed.

The company plans erection of a six-track permanent structure and expects its Leatherwood operation to be the largest non-captive mine in Kentucky. In March the mine loaded 46,887 tons of coal from entries only, a rate achieved in only twelve months that included a three-month strike.

Glen Alden Plans To Refill Strippings

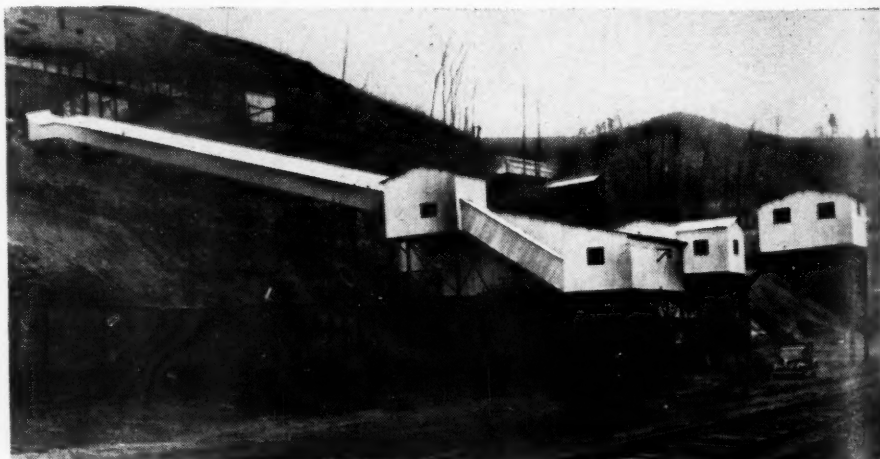
The Glen Alden Coal Co., Scranton, has announced that it intends to refill stripped areas under its control. Operations along main highways will be refilled for 150 ft. from the center of the road and where dwellings are involved the pits will be filled to a minimum of 300 ft. from the dwelling and to a greater distance if considered advisable.

Cave-In Study Under Consideration

The Bureau of Mines has offered to make a comprehensive engineering study of the anthracite mining field of Pennsylvania in cooperation with the state at a cost of \$250,000 to assist in prevention of cave-ins. This project is based upon an investigation by S. H. Ash, chief of the Bureau's Safety Division in Washington, and James Westfield, a mining engineer in charge of a special anthracite investigation. A plan of filling in the worked-out underground areas with waste or other material is described in the Bureau's current report, together with a presentation of the various systems of packfilling and the technical problems involved.

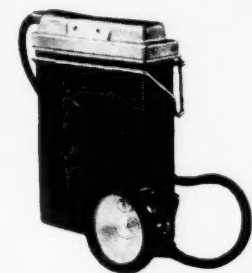
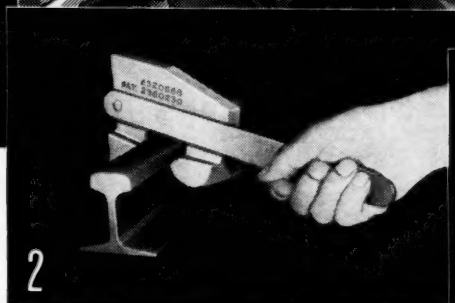
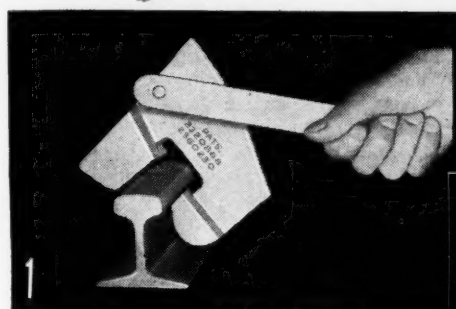
Nanticoke To Regulate All Mine Operation

An ordinance designed to regulate and control all strip- and deep-mine operations within the city limits was passed by the city council of Nanticoke, Pa., May 6. The ordinance creates a board consisting of a paid practical mining engineer appointed by the mayor, the city engineer and the assistant city engineer. The board is directed to make a report once a year, or oftener if requested, of its investigations. Its duties, as outlined in the ordinance, include entering, inspecting, examining and surveying any mine or colliery within the city limits as often as the practical mining engineer deems necessary, plus the examination of maps and

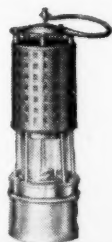


The temporary steel tipple of the Leatherwood mine, Blue Diamond Coal Co., set up for handling 625,000 tons yearly, was moved from the company's property in Bonny Blue, Va.

NOW Available— THE NEW HOLMESTED CAR STOP



THE WHEAT
PRODUCTIVE
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FLAME
SAFETY LAMP

SAFE-POSITIVE-INDESTRUCTIBLE

Wheat Lamp Sales Co. announces it can now take orders for the NEW HOLMESTED PATENTED CAR STOP.

This car stop represents a new and radical change in material and design to insure complete safety.

It is Indestructible—made of a single piece of Cast Tisco Manganese Steel—no parts to get out of order.

It is Simple—installation and removal require only a few seconds—safety handles supplied separately.

Protect your workmen and equipment today by ordering the new Holmested Patented Car Stop, available in sizes suitable for 20-pound to 60-pound rails.

For further information write Wheat Lamp Sales Co.—exclusive distributor who will be glad to demonstrate new car stop on request.

WHEAT LAMP SALES COMPANY

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Both are tough... but ONE is tougher!

WHEN TWO barnyard cocks start out to settle their differences, one thing is certain—they can't both win. Both may be plenty tough... but one will be tougher.

MOST WIRE ROPES are tough, too, but some are tougher than others. Rochester wire ropes, we believe, stand up longer in the battle against wear, tear and strain.

ROCHESTER WIRE ROPES are extra strong for four good reasons: (1) the **MEN** who make them are expert workmen... (2) the **MATERIALS** are the finest we can buy... (3) the **METHODS** are those proved best by the test of our wide experience in wire rope fabrication... (4) the **MACHINERY** is the most modern in the industry... Rochester wire ropes in all sizes, types, grades and constructions are now available for prompt shipment. Rochester Ropes' engineers can advise you on your special problems of wire rope selection, use and maintenance. Inquiries invited.



LOCKED-IN LUBRICATION is forced by air pressure between individual wires. This process requires twice as much lubricant as is absorbed by other methods... protects against internal friction caused by rope passing over sheaves... assures longer life and better service from wire ropes made by Rochester.

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plans for the extension of workings or excavations and tunnels.

The purpose of these investigations and surveys, as set forth by the ordinance, is to determine "the extent and manner of digging, mining, removing or carrying away the coal, rock, earth or other materials forming a natural support for the surface beneath public highways, streets, alleys, courts and other places in the city and the placing or construction of artificial permanent supports to uphold and preserve the stability of the surface."

Jap Mine Disaster Sets New Record

Details of the world's worst mining disaster in which 1,527 persons, mostly Chinese and Koreans, lost their lives and which Japanese military authorities suppressed for 34 years, were disclosed recently in a report prepared by Kirk V. Cammack, mining engineer on duty with the Mining and Geology Division, Natural Resources Section of SCAP, and formerly a staff member of the Mining Division, U. S. Geological Survey, Denver.

The tragedy, which occurred on April 26, 1942, at the Honkeiko colliery operated by the Japanese in the Penhsihu coal field in Manchuria, was caused by an underground explosion. News of the tragedy, comparable only to that which killed 1,110 French miners at Pas de Calais, France, in 1906, was kept secret by Japanese military authorities for one month—even from their own government and they never informed the outside world.

The Manchurian catastrophe occurred when a short in the mine's electrical system ignited methane gas which had collected in the underground galleries as a power failure brought the colliery's ventilating system to a stop, the report says. The resulting blast in turn ignited coal dust throughout the mine's tunnels for a distance of more than 2 km. and trapped some 4,400 workers reported underground at the time.

In addition to the 1,527 dead, 268 more were injured, 22 of them fatally. Most of the victims died of carbon monoxide poisoning as they vainly tried to reach the mine's entrance. Relatively few were killed by concussion or burns.

Attempts at rescue operations, undertaken two and a half hours after the explosion, failed as rescue equipment proved defective and available personnel were untrained in its use. Ten days were required to remove the dead and 20 more were needed to put the mine again in operation, with the resulting loss of a whole month's coal production, Cammack's report showed. This probably influenced the military considerably in their decision not to notify even their own government, it was believed.

The mine was previously an excellent coal producer, averaging close to 1,000,000 metric tons annually. It produced 900,000 tons in 1941.

Prior to the Honkeiko colliery explosion, the greatest coal mine disaster had been that which occurred 40 years ago on March 10, 1906 at Courrieres, Pas de Calais, France when 1,110 died. Up to the time of the present Natural Resources Section report, it

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is yours Today!

Tomorrow's way in power shovel operation is automatic control, and the tops in automatic control is *metered vacuum power control*—exclusive on Buckeye Clipper 1/2 and 3/4 yard convertible shovels *today*.

Vacuum power control eliminates the fatiguing pound and jerk of manual control but retains the full "feel" of operations; crowd, hoist, swing, dump and travel.

Metered vacuum power control is the simplest of automatic control systems—no troubles arising from leakage, condensation or frozen lines—requires minimum maintenance—no refills of hydraulic fluid.

Metered vacuum power control saves fuel, cuts wear and tear, and reduces maintenance costs. All front end attachments—shovel, trench hoe, crane—respond faster, smoother and better.

Buckeye Clippers bring new ease and economy to power shovel operation. It's tomorrow's way and it can be yours *today*. Discover the many superior features of Buckeye Convertible Shovels. Send for new catalog.

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BUCKEYE VACUUM POWER CONTROL

- ✓ Fast, positive response — eliminates the time lag
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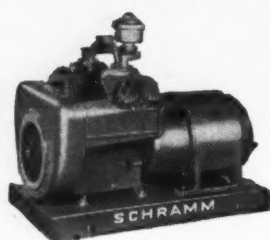
CONVERTIBLE SHOVELS — BULLDOZERS — ROAD WIDENERS
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AIR COMPRESSOR

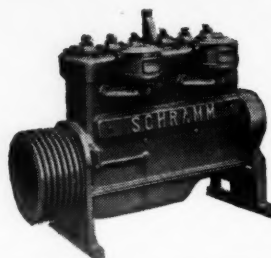
... for your every need!

SIZES RANGING FROM 2 TO 600 CU. FT. DISPLACEMENT



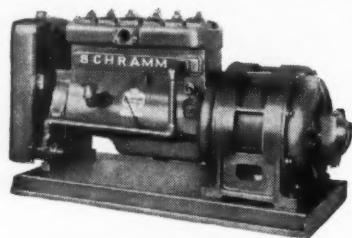
DIRECT DRIVE ON BASE

Built-in Motor Drive mounted on steel base is compact and easy to install. No foundations necessary.



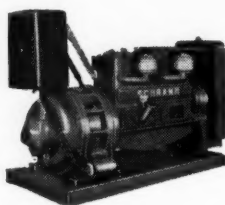
WITH "V" GROOVE PULLEY

Schramm Belt Driven Compressors can be obtained with "V" or flat belt drive suitable for twenty-four hour service and economical operation.



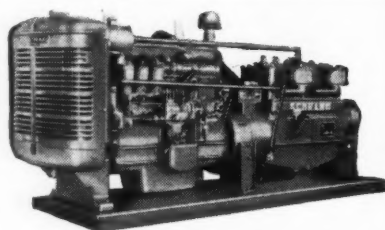
DIRECT MOTOR DRIVE WITH COOLING UNIT

Schramm 300 cu. ft. displacement with direct-connected 50 H.P. motor with cooling unit on Steel Deck Base.



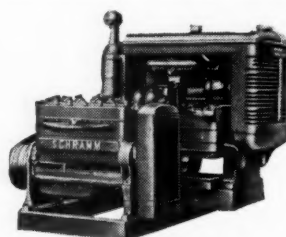
DIRECT DRIVE WITH STARTER AND RADIATOR

Both compressor and motor are mounted as a single unit on a substantial steel base with starter, radiator, and cooling unit.



DIESEL ENGINE DRIVE-IN LINE

Complete self-aligned, direct connected Diesel Engine Driven Compressor for semi-portable or stationary installation.



BELT DRIVE ON BASE WITH ENGINE

Schramm Engine Belt Drive on Base combinations are available for applications not reached by electric power service in mill, mine, and other industrial plants.

SCHRAMM INC.

COMPRESSOR SPECIALISTS
WEST CHESTER
PENNSYLVANIA

was thought that the French tragedy and the one that claimed 439 lives on Oct. 14, 1913 at Sengherryedd, Wales, were the two worst catastrophes in mining history.

Now, according to the Natural Resources Section, not only does the Honkeiko colliery tragedy take preeminence over all others, but two other Oriental mining disasters are revealed to have fatality records which place them third and fourth in the list.

Both accidents were in Japanese-operated mines and news of both was suppressed by them. The first occurred on Dec. 5, 1914 at Hogyo collieries of the Mitsubishi Mining Co. in Kyushu, Japan, killing 667 out of a total of 687 miners employed underground. The second, likewise a Manchurian tragedy, happened on June 11, 1917, at Tashan in the Fushun collieries where 917 died.

The greatest loss of life in American coal mining history occurred six months later at Monongah, West Virginia, on Dec. 6, 1917, when 361 died.

The magnitude of the Honkeiko catastrophe becomes apparent when the number of fatalities is compared with the total suffered by the entire Japanese coal mining industry in a year's operations. In 1941 coal mining accidents killed 1,582; in 1942, 1,488; in 1943, 1,670 and in the first half of 1944, 1,026.

In comparison, the United States coal-mining industry, while mining ten times as much coal annually, never suffered as many deaths in a year's time as did the Japanese. Figured either on a basis of total tons mined or total man-hours employed, Japanese fatalities outnumbered those of the United States about 17 to 1, according to comparisons made by Natural Resources officials.

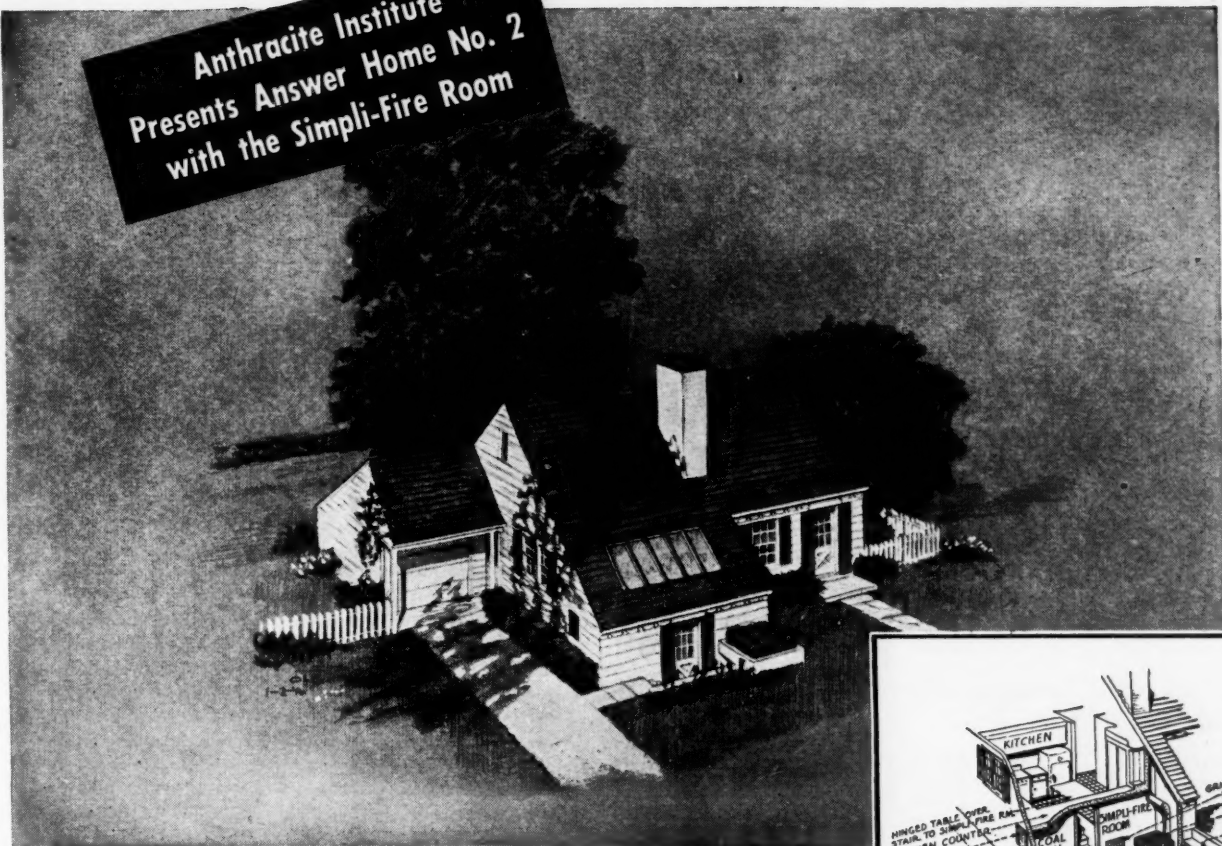
Control of Stripping Planned by County

Plans to halt strip mining if possible, or at least to require coal companies to level off the ground after stripping is completed, have been revealed by the Daviess County, Indiana, planning commission. According to McKinley Vance, commission chairman, a master plan for zoning the county is now being prepared. If made an ordinance by county commissioners, it would require strip-mine operators to replace and level off the land after mining is completed. Strip mining on the better farm land of the county would be prohibited altogether by the proposed plan.

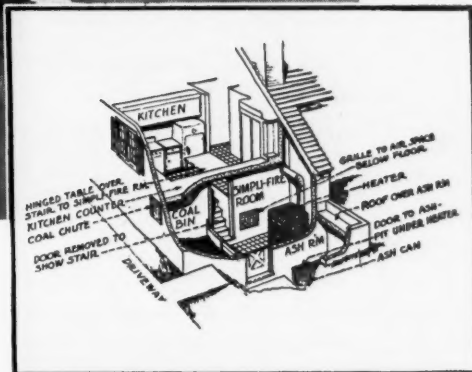
Hudson Employees Awarded Certificates

Presentation of certificates to 14 members completing the first year of the three-year course featured the commencement exercises and dinner of the school on coal preparation, sponsored by the Hudson Coal Co. under the direction of the Pennsylvania State College Division of Extension, held last month at the American Legion Home in Plymouth, Pa. John P. McLaughlin, assistant superintendent of preparation for the Hudson Coal Co., served as instructor, and the class was composed of

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Presents Answer Home No. 2
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More House, More Heat for Less Money thanks to Anthracite Simpli-Fire Room!



Simpli-Fire Room . . . Heart of the Answer Home. Note its compact simplicity. See how handy it is to feed the heater . . . how ash shoveling has been eliminated!

HERE is a new slant on anthracite! Anthracite in a bright new package, appealing to everyone, architects, builders, and home owners alike! And the story is being told with traveling displays and speakers . . . on the air . . . in magazines and newspapers with advertisements and up-to-the-minute news stories . . . in booklets and folders.

"Heat," explains the Anthracite Institute, "is needed only part of the year, even in anthracite areas. Money saved on a scientifically engineered anthracite heating arrangement can be used to buy more home."

Working on this principle, Chapman and Evans, small homes specialists, de-

veloped the Answer Home with the Simpli-Fire Room, one of the most important developments of recent years.

In the first place, the new design helps cut building costs, thereby creating business for architect and builder, thus uniting coal and building trades.

Second, the Simpli-Fire Room specially designed for economical anthracite heating, makes anthracite easy to use . . . helps hold old markets, builds new.

Plans for Answer Home No. 2 are ready

for architects and builders . . . with definitive drawings explaining details.

If you have not received your copy, write for "More House for Less Money," showing Answer Home Nos. 1, 2 and 3 with floor plans.

For FREE Plans of this Answer Home—and others—fill out—mail coupon today.

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Please send me free of charge my copy of 16-page brochure, "More House for Less Money."

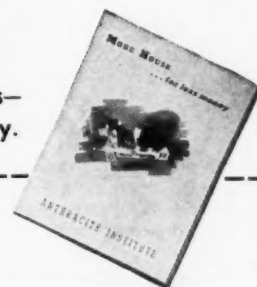
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ANTHRACITE INSTITUTE

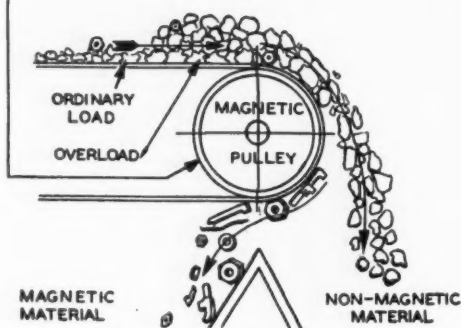
101 PARK AVENUE, NEW YORK 17, N. Y.

COAL AGE • June, 1946

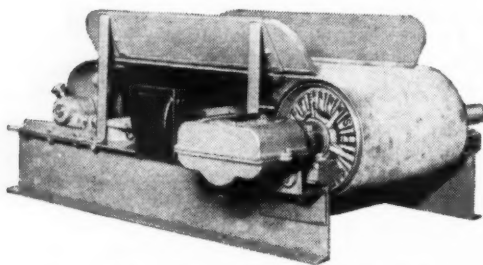


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Magnetic
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Completely self-contained Magnetic Pulley type Separators with belt, tail pulley, frame—or with two magnetic pulleys, depending upon your capacity and separation desired.



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employees of the Loree, Pine Ridge, Laffin, Delaware and Baltimore No. 5 collieries.

William Wilson, of the company's inspection department, the class president, presided at the exercises, and certificates were presented to the following: John Suffeta, James Cost, John Gavenonis, Winifred Shaffer, Samuel J. Leonard, Cyrus Powell, Robert J. Maher, Connie J. Duhoski, William Wilson, H. P. Davis, Robert Hurtt, William J. Dwyer, Nicholas L. Lamb and Joseph Vojtex.

Anthracite Laboratory Urged in Congress

Appropriation of \$450,000 for construction of an anthracite research laboratory, authorized by Congress in 1942 but never built because of the war, was recommended by the House Appropriations Committee May 7. The laboratory is to be located in the Anthracite region of Pennsylvania and will seek new, more-economical and more-efficient methods of anthracite mining, consumption and utilization. Exact location of the proposed building has not been decided.

Central W. Va. Meeting Held at Fairmont

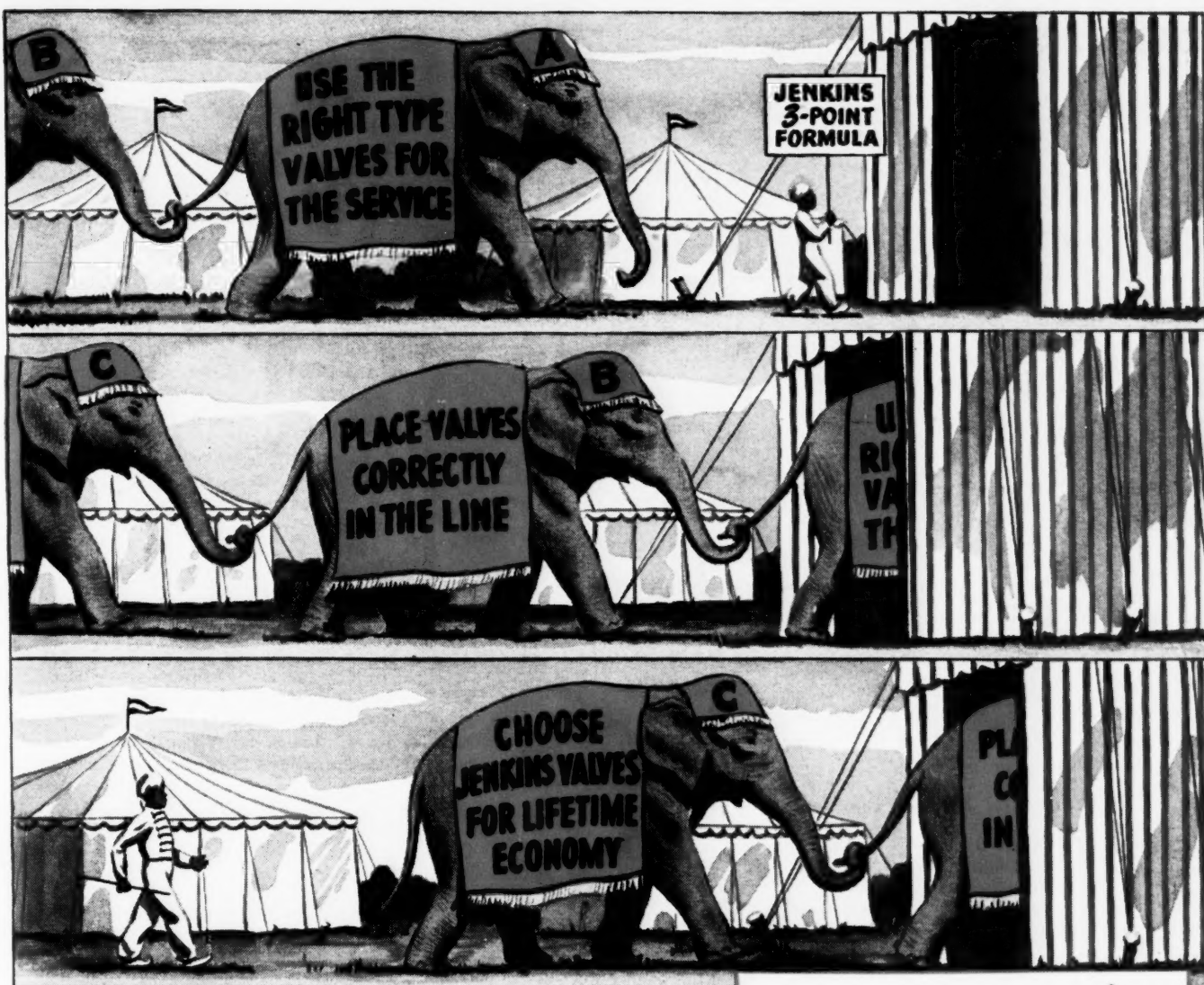
Approximately 75 members of the Central West Virginia Coal Mining Institute, at the regular monthly meeting May 24 at the Elk's Home in Fairmont, went on record to extend best wishes to P. J. McGraw, who has been appointed State mine inspector at large for Northern West Virginia to succeed the late Pete McLinden. As the feature of the meeting, Troy Lake, electrical engineer, Monongahela Power Co., presented a broad discussion of electricity.

Overseas Coal Notes

British consumption of coal for industrial purposes is rapidly increasing, according to Emanuel Shinwell, Minister of Fuel and Power, and already is slightly higher than during the war. He warned that he was starting his new coal budget with a deficit because of drains on an already dangerously low supply, according to reports from the McGraw-Hill World News Bureau on this and other foreign coal developments.

Coal production now is 3,800,000 tons a week, he asserted, compared with 4,000,000 tons before the war, but exports will total only 5,000,000 tons annually compared with 30,000,000 to 40,000,000 tons pre-war. Despite the increased demands, he said, there are 24,000 fewer men at work now than at the same time last year. He warned that another 4,000 face workers are needed.

Deeper open-cast mining may be necessary, Mr. Shinwell said, adding that he had been advised that there are millions of tons of coal in the Newcastle area at a depth of about 100 ft. and that it is estimated there are at least 50,000,000 tons in Northumberland and Durham at that depth. The question of mining these deposits hinges on the



A Good "Lead" to Lower Valve Costs

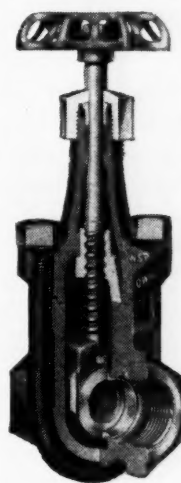
By choosing Jenkins Valves, you not only get valves made with *extra* endurance that means *extra* economy.

You also get the experienced advice of top-rated valve specialists, Jenkins Engineers, on any question of selection or placement. Write for Booklet No. 944 on installation.

Base your valve buying on the 3-Point Formula, and make sure of the *extra* value that means *lowest cost in the long run*.

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Jenkins U-Bolt Gate Valve



Its Patented Bonnet Saver Bushing, Heavy Duty Body and Bonnet, and Easy Accessibility are three of sixteen advanced features that reduce care and guard against wear. Compare it, feature for feature, and you'll agree it's tops in its class!

Sizes 1/4" to 3". Working Pressure up to 125 lbs. steam or 175 lbs. O.W.G. Bronze Mounted or All Iron—Screwed or Flanged.

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LOOK FOR THIS FAMOUS DIAMOND MARK

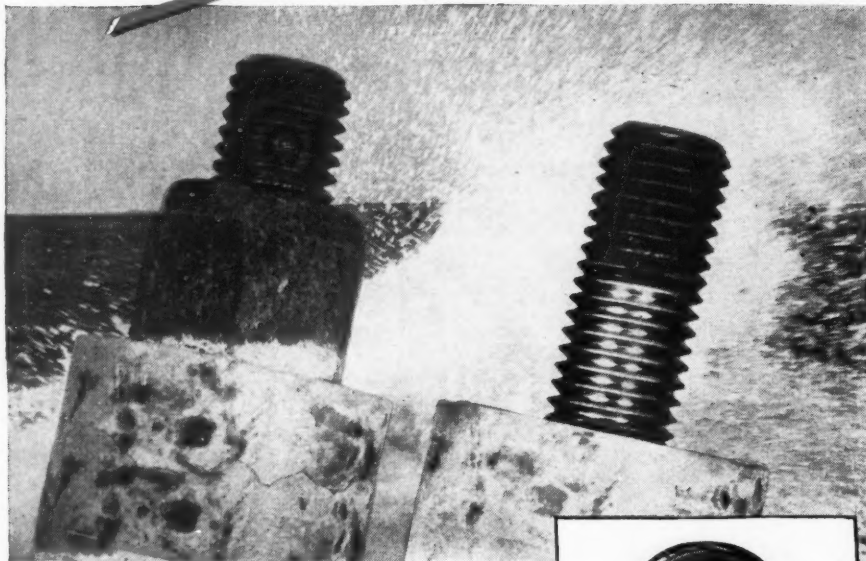
SINCE 1864 • THE MARK OF TRUSTWORTHY VALVES

BRONZE • IRON • STEEL • CORROSION-RESISTING ALLOYS . . . 125 TO 600 LBS. PRESSURE . . . OVER 600 PATTERNS FOR EVERY INDUSTRIAL, ENGINEERING, MARINE, PLUMBING-HEATING SERVICE

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Prevent Corrosion

OF BOLT THREADS



—with the Red Elastic Collar that protects the threads against Liquid Seepage

Moisture cannot penetrate the Red Elastic Collar. Study the heavily corroded bolt and nut assembly in the unretouched test photograph. It has been subjected to the equivalent of three years' exposure to moisture . . . to industrial smoke and grime . . . to climatic change. Study the same bolt with the nut removed. Look at the bolt threads that were inside the Elastic Stop Nut. They're as good as new! Why? Because the Red Elastic Collar protects them permanently against Liquid Seepage—and Corrosion.

Elastic Stop Nuts are easily removed because they cannot 'rust solid'. They prevent fasteners from failing because of corrosion weakened threads.

Here's a challenge: Send us complete details of your toughest bolted trouble spot. We'll supply test nuts—FREE, in experimental quantities. For further information or literature address: Elastic Stop Nut Corporation of America, Union, New Jersey. Agents and Representatives located in principal cities.



The RED ELASTIC COLLAR

—denoting an ESNA product—

. . . is threadless and permanently elastic. Every bolt—regardless of commercial tolerances—impresses (does not cut) its full thread contact in the Red Elastic Collar. This threading action produces a compressive, radial-reactive pressure against both the top and bottom sides of the bolt threads . . . insures a permanently tight, full contact between the bolt and nut threads . . . and makes all Elastic Stop Nuts self-sealing against Liquid Seepage.

As a result, all Elastic Stop Nuts protect permanently against thread corrosion.



ELASTIC STOP NUTS



INTERNAL
WRENCHING



ANCHOR



INSTRUMENT
MOUNTING



SPLINE



CLINCH



GANG
CHANNEL

PRODUCTS OF: ELASTIC STOP NUT CORPORATION OF AMERICA

machinery situation, he stated. "If we get all the coal we want from deep mining operations, we may not need to touch this coal."

Mr. Shinwell recently inspected open-cast sites at Newcastle where 251,653 tons of coal will have been removed and the land restored to its original grassy state by next May at an average cost of \$5.20 per ton. The national average is \$5.90 per ton.

A new northern coalfield in the Pechora region of Russia, about 200 miles northeast of Archangel and close to the Arctic Sea, will be tapped by 21 new shafts according to plans recently completed by the State Mine Projecting Institute in Leningrad. A high degree of mechanization and new features to cope with the frigid cold keynote the designs for the proposed mines.

During the next five years 4,500 coal-mining engineers will be trained for work in the Donbas mines of Russia, according to the ministry in charge of the mines. This is a part of the large-scale rehabilitation planned for these coal fields, by which it is hoped to bring output up to pre-war levels, to mechanize all cutting, and to increase concentration-plant capacity.

Mass production of combined cutting, crushing and loading machines is planned in a plant at Kopeisk, U.S.S.R., it was recently reported. Two new combines were designed during the war, according to Soviet sources. One of them works heavily inclined strata, while the other is for small seams of soft coals. Both machines are reported to have made good showings in tests.

More than a thousand miles of new railroad trackage built as a wartime expedient is resulting in large scale exploitation of the fabulous Vorkuta coal field which, because of its location well beyond the Arctic Circle, was regarded almost as a "no man's land" not many years ago.

The Vorkuta deposits, in the heart of endless stretches of swampy tundra, have been estimated at 120 billion tons compared to 90 billion in the highly developed Donets Basin.

A five-year plan for improving France's nationalized coal mines has been announced by the French government. Work during this year and next will call for 185,000 tons of iron and steel products and require imported materials worth \$45,000,000.

Recent explorations have located an important deposit of anthracite coal near a railway junction about 100 km. south of Berlin, Germany. The deposit covers an area of 15 to 24 km. square and is estimated to contain about 100,000,000 tons of coal, of which 60,000,000 tons probably could be mined. The coal appears in 14 layers, the uppermost layer being only 60 m. underground and the lowest being about 500 m. according to the foreign press.

Among the several European countries hard hit by the strike-caused stoppage of coal imports from the United States is Sweden, whose recent imports of 90,000 to 125,000 tons a month of American coal fell off to nothing in April.

Even before the strike, the Swedes were obtaining from all sources not much more than a quarter of their coal and coke needs,

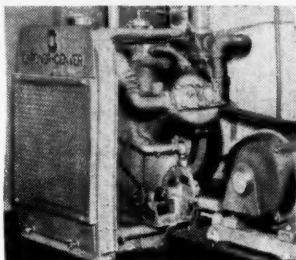
WANTED

Millions of tons of anthracite and bituminous coal if the enormous postwar demands of industry, transportation and the home are to be met.

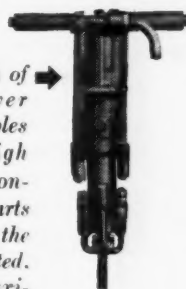
... And here's help in getting it

Dependable Gardner-Denver mining equipment has the speed and power to cut drilling and hauling time. It has the stamina to stay on the job shift after shift—day after day.

Let us show you how Gardner-Denver equipment can help you increase production—cut operating and maintenance costs. For complete information, write Gardner-Denver Company, Quincy, Illinois.



↑ The completely water-jacketed cylinder and head of this Gardner-Denver "WB" 2-stage Vertical Compressor insures continuous, full-load operation in any season. Wear is reduced—oil consumption is low—cool discharge temperature prolongs life of air hose and tools.

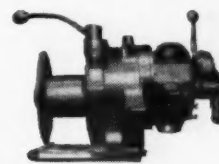
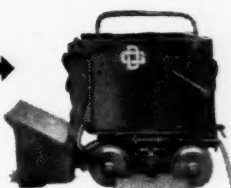


→ The rugged construction of these Gardner-Denver Hand Held Drills enables them to withstand high speed operation and constant pounding. All parts are precision made of the highest grade, heat-treated, alloy steel to provide maximum wear. Sizes and weights vary to suit ground conditions.



← Gardner-Denver CF89-H Continuous Feed Drifters require little attention from either the drill runner or the maintenance man. Once set, feed is automatically adjusted to hardness of ground. Built-in feed motor absorbs recoil—perfect balance between air consumption, rotative power and rate of penetration eliminates excessive vibration.

The two 5-cylinder radial air motors of this Gardner-Denver Mine Car Loader, together with its fulcrum principle, provide greater crowd. Faster lift and discharge are assured.



↑ The reversible air motor of the Gardner-Denver HB Air Hoist assures strength and speed for faster hauling of heavier loads. Smooth vibrationless operation. All moving parts are sealed against moisture and grit.

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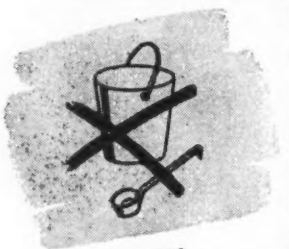


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which are estimated at 10 to 10½ million tons a year, and American coal will stay popular despite its cost in Sweden of \$19 a ton, compared with \$6 to \$8.50 for the European product.

In the long run, Sweden hopes to ease its coal crisis with Polish coal. Last summer an agreement was reached under which Poland undertook to deliver 5,000,000 tons of coal and 1,000,000 tons of coke to Sweden by Dec. 1, 1946, as well as several other commodities. In return, Sweden would export various goods to Poland, and granted Poland a credit of \$24,000,000. Up to the end of 1945, however, Sweden had received only 165,000 tons of the agreed amount from Poland and during the winter Polish coal shipments increased only slightly.

A statutory federal agency, which will be empowered to grant a "bounty" to all coal-mine operators willing to come under its jurisdiction, is proposed in a report on the Australian coal-mining industry recently released by the Commonwealth government.

Discussing some of the shortcomings of the Australian mining picture, the report asserts that the Commonwealth is more backward in mechanization than practically any other coal-producing nation and cites the opposition of the miners to improvements. In New South Wales mechanical loaders are barred as an aid to extraction of coal left in pillars, except with approval of the Minister of Mines, who, it is stated, consistently refuses permission.

The innumerable strikes, according to the report, are due to a complete lack of discipline, and to intensive propaganda by disaffected groups which claim all abuses would be eliminated by nationalization of the mines.

On the nationalization question, according to the report, the chief State-owned mine at Lithgow has a higher accident rate than private mines, has been mechanized to a lesser degree, and sells coal to the government at a higher cost than coal of equal quality could be obtained from private producers in the same area.

Preparation Facilities

RHONDA COAL CO., Dunmore, Pa.—Contract closed with Deister Concentrator Co. for two SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning No. 4 buck.

DEANGELIS COAL CO., Carbondale, Pa.—Contract closed with Deister Concentrator Co. for four SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning rice and No. 4 buck anthracite.

HANNA COAL CO., Piney Fork, Ohio—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck coal-washing table for 4x0-in. bituminous coal.

LIVE OAK COAL CO., Primrose Breaker, Minersville, Pa.—Contract closed with Wilmot Engineering Co. for two Type D Wilmot Simplex jigs to prepare stove and nut coal, total feed capacity, 40 t.p.h.

JOLIETT COAL CO., Tremont, Pa.—Contract closed with Wilmot Engineering Co. for one Type D Wilmot Simplex jig to prepare egg coal; feed capacity, 20 t.p.h.

WOODWARD IRON CO., Woodward, Ala.—Contract closed with Jeffrey Mfg. Co. for one three-compartment 7-ft. Baum jig;

Congress has acted—and along these lines—since this editorial was written. If the President signs the legislation, we have taken one step forward. If he vetoes it, the voters must resolve a conflict between two branches of their government.

THE LABOR CRISIS

—it's up to Congress

IT HAS remained for John L. Lewis to demonstrate conclusively that, under the sponsorship of the federal government, the power of organized labor has been built up to a point where it can be used to paralyze the economic life of the nation. Therefore, in the elemental interest of self-preservation, the first order of the day is to cut down the power of organized labor to a point where irresponsible leaders no longer have the power to use it to cut down the country.

This will prove an exceedingly complicated job. The federal government, over a dozen years, has developed and buttressed the power of organized labor by many separate steps. They are interlaced in a pattern which cannot easily be unravelled.

Cutting down the power of organized labor to proper proportions will be an operation almost as delicate as brain surgery. To be successful it must impair no basic American political or economic right. It must leave intact the right of workers to organize and bargain collectively through representatives of their own choosing. It must leave intact the right to strike. But it must disassociate from the exercise of these rights opportunities for devastating abuse of the public welfare such as those demonstrated by Mr. Lewis. A meat axe is not the instrument for this operation.

Because of the complexity and delicacy of the operation to be performed it would be helpful if it could be carried out in a tranquil atmosphere. The urgency of the problem is such, however, that no time can be lost in getting at it.

Guiding Principles

However, the dangers that haste or heat will lead to serious blunders can be largely eliminated if the process of bringing the power of organized labor back within safe and reasonable bounds is governed by principles to which all fair minded people can fully subscribe.

The most important of these principles is that it is an abuse of public authority to extend special privileges to organized labor.

When in 1935 Congress passed the Wagner Labor Relations Act, one of the great buttresses of the power of organized labor, it was upon the explicit theory that organized labor was weak and needed coddling by the federal government if it were to survive, let alone grow big and strong. In the policy

section of that act it was stated that "the inequality of bargaining power between employees who do not possess full freedom of association or actual liberty of contract, and employers who are organized in the corporate or other forms of ownership association substantially burdens and affects the flow of commerce . . ."

Regardless of whether or not that was a correct reflection of the situation in 1935, it bears no relation to the situation today. Under the continuous sponsorship of the federal government, the power and bulk of organized labor has waxed until today it is preposterous to regard it as the weak sister in its bargaining with employers. If, after being continuously demonstrated since V-J Day, the proposition that the pendulum of organized power has swung too far over on the side of organized labor needed any final and clinching demonstration, John L. Lewis provided it.

Changes in the Law

Translation of the principle that organized labor is no longer a weakling, requiring a diet of special privileges, into specific legislative enactments is a detailed technical operation beyond the scope of this statement. It is possible, however, to indicate some of the general lines it should follow. Here they are:

1. The duty to bargain collectively, now imposed upon employers by the Wagner Act, should also be imposed upon the leaders of organized labor who are now under no legal compulsion to bargain.

For well over a month Mr. Lewis made a complete mockery of the process of collective bargaining by refusing even to state his demands until the coal operators had approved "in principle" a plan for a miners' "health and welfare" fund which he fancied. In the meantime the country was plunged into an ever deepening crisis.

2. Unions, as well as employers, should be made liable to suit for damages for breaking their collective bargaining agreements.

A degree of responsibility commensurate with their age and power requires that unions be liable, to the extent of union funds but not the funds of individual members, for carrying out their agreements. To have it otherwise is to hold that a collective bargaining agreement is, by defi-

dition, a phoney agreement so far as the union is concerned. Outlaw strikes are the fruit of this lop-sided arrangement.

3. Employers should be given more discretion, in reinstating employees who have gone on strike than is now permitted by the Wagner Act.

The Wagner Act largely eliminates the risks involved in striking because of the requirements it imposes upon employers to take workers back when they have decided to return to work. These requirements make it virtually impossible for the employer to replace workers even if they are engaged in the most unjustifiable of strikes. At the least workers who have smashed up property and stirred up violence in the course of a strike should have no rights under the Wagner Act. How much further the Wagner Act strait-jacket should be loosened at this point should be carefully explored, and excesses encouraged by the Act should be removed.

4. The wedge which the National Labor Relations Board has driven into the orderly conduct of American industry by holding that foremen are covered by the Wagner Act should be eliminated.

The issue involved here is continuously mislabelled and confused as that of the right of foremen to organize. There is no question of the right of foremen to organize any kind of a legal organization they desire. That is their right as American citizens. The issue is whether or not the special privileges accorded by the Wagner Act, which in some circumstances has been so construed as even to prevent employers from talking with their workers, should be extended to foremen who, if American industry is to have a chance to do its duty effectively, must represent management with full loyalty and responsibility.

A member of John L. Lewis' United Mine Workers takes an oath which provides, in part, "that I will not reveal to any employer or boss the name of anyone a member of our union" and will "defend on all occasions and to the extent of my ability the members of our organization." Mr. Lewis insists that the coal operators contract to deal with foremen to be organized in a union where they will take that oath, and where their activities will be separated from the influence of employers by the barriers imposed by the Wagner Act. Such an arrangement undercuts orderly management of American industry.

5. The exemption of labor unions from the federal anti-trust laws, provided when organized labor was presumed to be weak, should be modified to take account of its vastly increased strength, and

the use of this strength to destroy business enterprise and create monopoly.

As matters stand unions can run employers completely out of business by secondary boycotts and run fellow workers out of jobs in the process. An Ohio manufacturer, working with a government-certified C. I. O. union, is put out of business because A. F. of L. workers refuse to handle his products. Still the government, this time in the person of the United States Supreme Court, says that actions of this sort are above the law because Congress exempted unions from the federal anti-trust laws.

To eliminate one of the most devastating forms of restraint of trade, this exemption should be cut down forthwith by subjecting unions imposing secondary boycotts to the same penalties under the federal anti-trust laws as those to which employers doing the same thing are subjected. And the question of further narrowing the obsolete exemption of unions from the federal anti-trust laws should be fully explored.

6. The levying of special sales taxes for the exclusive benefit of unions should be prohibited by law.

As a matter of good government the right to levy consumption taxes should be reserved to the public authorities and used strictly for public purposes. As a matter of good economics, payments to workers or their organizations should be included in the payroll where they can be properly counted as part of the cost of production.

Equality Before the Law

When everything that can conceivably be accomplished by legislation has been accomplished there is no reason to believe that an ideal or even a surely workable system of industrial relations will have been devised. Many of the mainsprings of such a system lie deep in the hearts of men and far beyond the reach of legislation. There is no chance, however, of having such a system, or even a defensible system of democratic government until special privileges which tip the scales of power far on the side of organized labor are withdrawn and there is some measure of equality for employers and organized labor before the law. Though it is hard to believe it at the moment the country may come to be grateful to John L. Lewis for driving that lesson home so ruthlessly.



President, McGraw-Hill Publishing Company, Inc.

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TYPE OF WORK	Approximate No. of 1 1/4" x 8" Car- tridges per 100 lbs.
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Red H* C	276
Red H* D	316
Red H* F	356
<i>For Rock or Fine Coal</i>	
Red H* B	280
Collier* C	320
<i>For Wet Work</i>	
Hercogel* A	200
Hercogel* 2	240

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COAL AGE • June, 1946

XP-54

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TRUAX-TRAEER COAL CO., Colcord, W. Va.—Contract closed with Kanawha Mfg. Co. for coal-handling system consisting of individual drop-bottom bins for separate dumping of No. 2 Gas and Powellton seams, adjustable feeders for blending two seams into a 1,000-ft. rope-and-button conveyor which delivers to a 300-ton concrete silo, 700-ft. horizontal belt conveyor which delivers to two-track mine-run tippie; all steel structures; capacity, 600 t.p.h.

Personal Notes

Joseph W. Stewart, recently released from the Navy as a lieutenant, j.g., has returned to the industrial engineering department, Island Creek Coal Co., Holden, W. Va.

Morman B. Gurley, recently associated with the West Virginia Steel & Mfg. Co., has become chief engineer of the Lando Coal Corp., the Puritan Coal Corp., and the Cameo Coal Mining Co., with headquarters in Huntington, W. Va. He had previously for many years been chief engineer, Red Jacket Coal Co.

Charles F. Kottcamp, recently released from the Navy as a lieutenant commander, has joined the staff of the Locomotive Development Committee, Bituminous Coal Research, Inc., and will be engaged in the development of the coal-burning gas turbine.

Battelle Memorial Institute, Columbus, Ohio, has announced the addition of three staff members. James A. Eibling, recently a major in the Army Engineers, will engage in research in fuels technology. James B. Purdy, formerly a major in the Army Air Corps, and John W. Tierman, formerly associated with the Manhattan District, have been assigned to the Institute's division of fuels research.

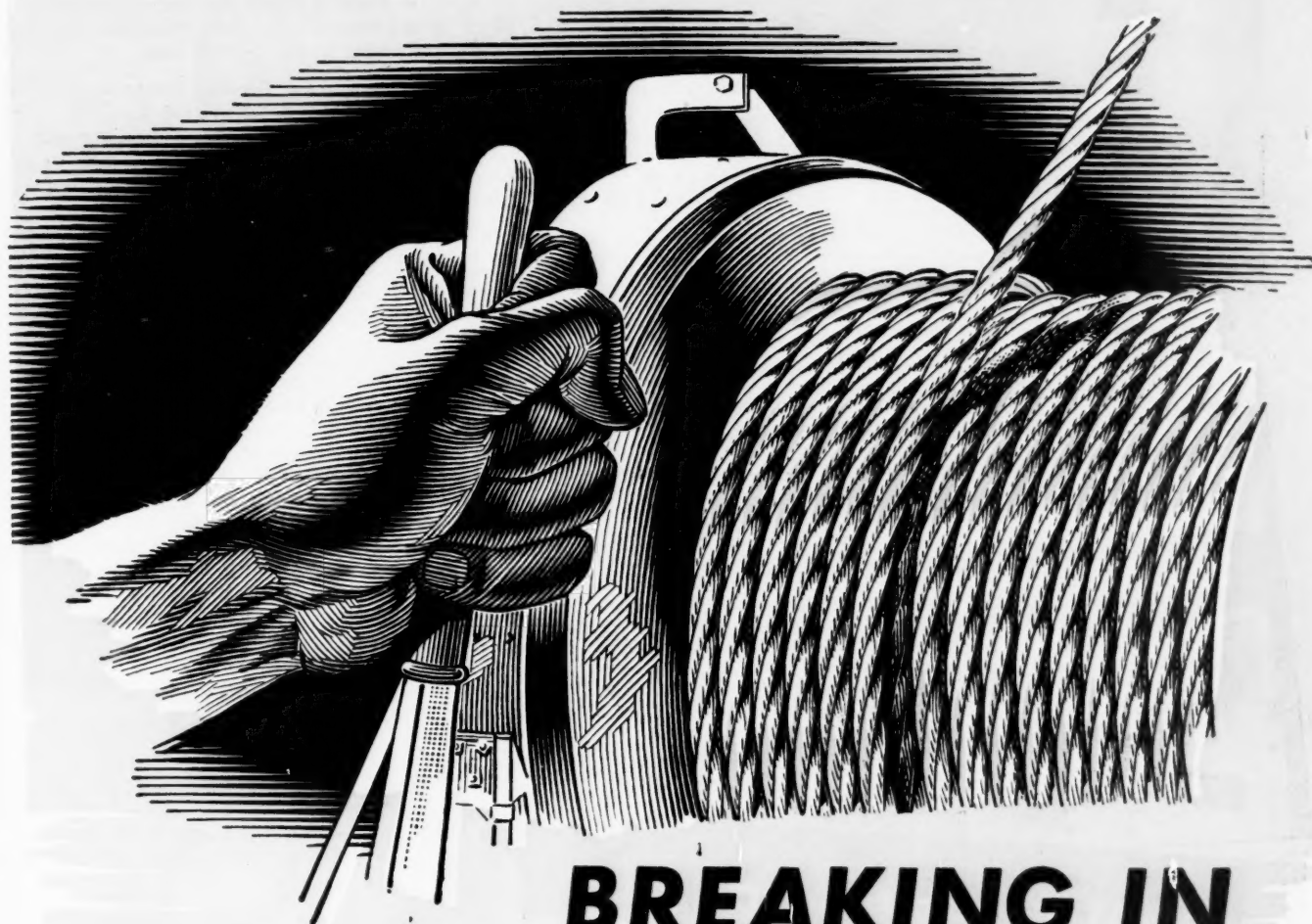
James Richie, formerly mine manager at the Westville No. 24 mine, Danville, Ill., has been transferred to a position with the Peabody Coal Co., West Frankfort, Ill.

John S. Palin, superintendent, Francis mine, Greensburg-Connellsville Coal Co., has been promoted to superintendent of mines with offices in Pittsburgh.

The Pittsburgh Coal Co. has announced the following changes in personnel: John L. Carroll, previously a safety inspector for the company, has been made general assistant foreman, at the Lindley mine, Canonsburg, Pa. At Montour No. 4 mine, Lawrence, Pa., Charles Taylor, formerly safety inspector, and Bill Tomko, fireboss, were named assistant mine foremen.

Lehigh Valley Coal Co., Wilkes-Barre, Pa., has announced several changes in personnel. H. C. Griesing, formerly superintendent at Henry colliery, has been appointed superintendent, Prospect colliery. W. A. Ruetelhuber, previously superintendent, Prospect colliery, has been assigned to special engineering and operating duties. William C. Kistler, formerly assistant superintendent, Hazleton Shaft colliery, has been named superintendent, Henry colliery, and Barton D. Grundy succeeds him as assistant

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superintendent, Hazelton Shaft colliery. **Harold Hontz**, previously machinist at the Drifton shops, has been promoted to master mechanic, Prospect and Henry collieries. **William E. Baskin** has been appointed general foreman, and **John Nicholson Jr.**, shop foreman, at the Drifton shops.

John L. G. Weysser, formerly employed by the Lehigh Navigation Coal Co. as a research mining engineer, has returned to the company as manager of its light-weight aggregate department with offices in Lansford, Pa.

Joseph E. Parker, formerly with the SFAW, has been appointed assistant to the president, Liberty Fuel Co., Salt Lake City, Utah.

Consolidation Coal Co. has announced the establishment of a purchasing department at Jenkins, Ky. for its Kentucky operations in Letcher, Harlan and Johnson Counties, and has named **Clyde Hennen** of the company's general purchasing department in Fairmont, W. Va., as purchasing agent in charge. **James L. Witt**, timber buyer for Consolidation at Jenkins prior to military service, has returned to Jenkins as assistant to Mr. Hennen.

Reuben Lee, for many years master mechanic of the McGregor No. 2, McGregor No. 6 and Paragon mines, Logan County Coal Corp., Slagle, W. Va., has retired. He will continue to make his home in Huntington, W. Va.

Joseph Pursglove, Pursglove Coal Mining Co., Pursglove, W. Va., is reportedly leaving in June for a four-month trip to South Africa, to study South African coals and coal mining.

L. Newton Thomas has been elected president of the Carbon Fuel Co., Charleston, W. Va., succeeding **Charles A. Cabell**, deceased.

Obituary

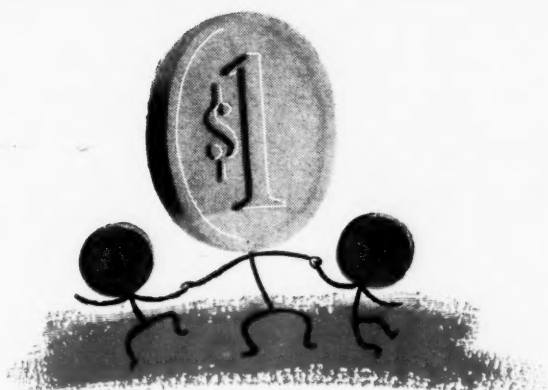
C. A. Cabell, 76, president since 1925 of the Carbon Fuel Co., Charleston, W. Va., died May 14 in Charleston. He was one of the original organizers of the Carbon Fuel Co. in 1905 and served as president of the Kanawha Coal Operators' Association for many years.

William R. Minds, 68, secretary and treasurer, Bulah Coal Mining Corp., and general manager, Minds Coal Mining Corp., Ramey, Pa., died May 3 at his home in Ramey after a long illness.

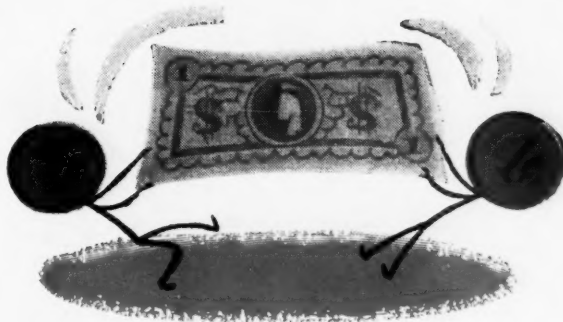
James Bryan, 74, mine foreman, No. 7 Colliery, Susquehanna Collieries Co., Nanticoke, Pa., died May 10 at his home after a sudden heart attack. He also had worked for many years for the Glen Alden Coal Co.

Harry G. Goulstone, 65, superintendent, Buttonwood colliery, Glen Alden Coal Co., Wilkes-Barre, Pa., died May 28 at his home in Kingston, Pa., after an illness of two months.

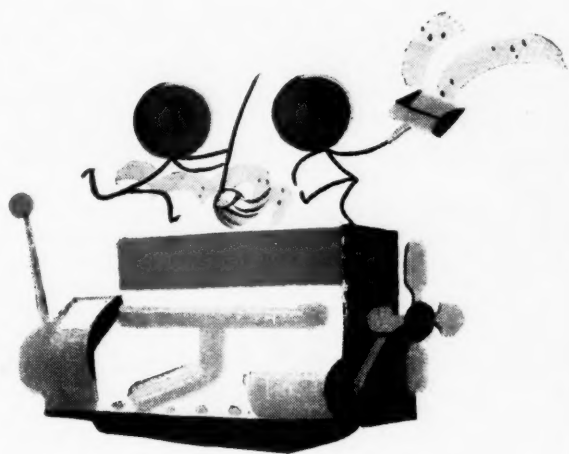
William R. Bottomley, mine inspector for the Pennsylvania 16th District since 1931, died June 1 at his home in Hazleton, Pa.



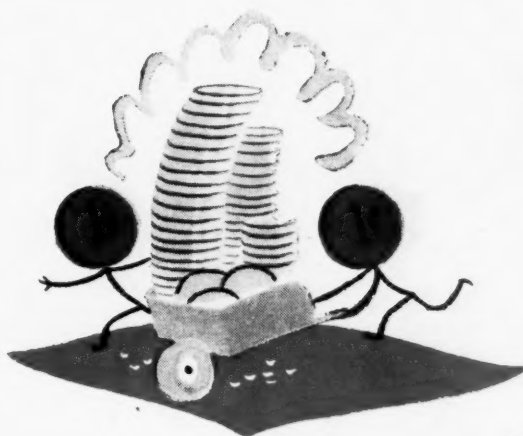
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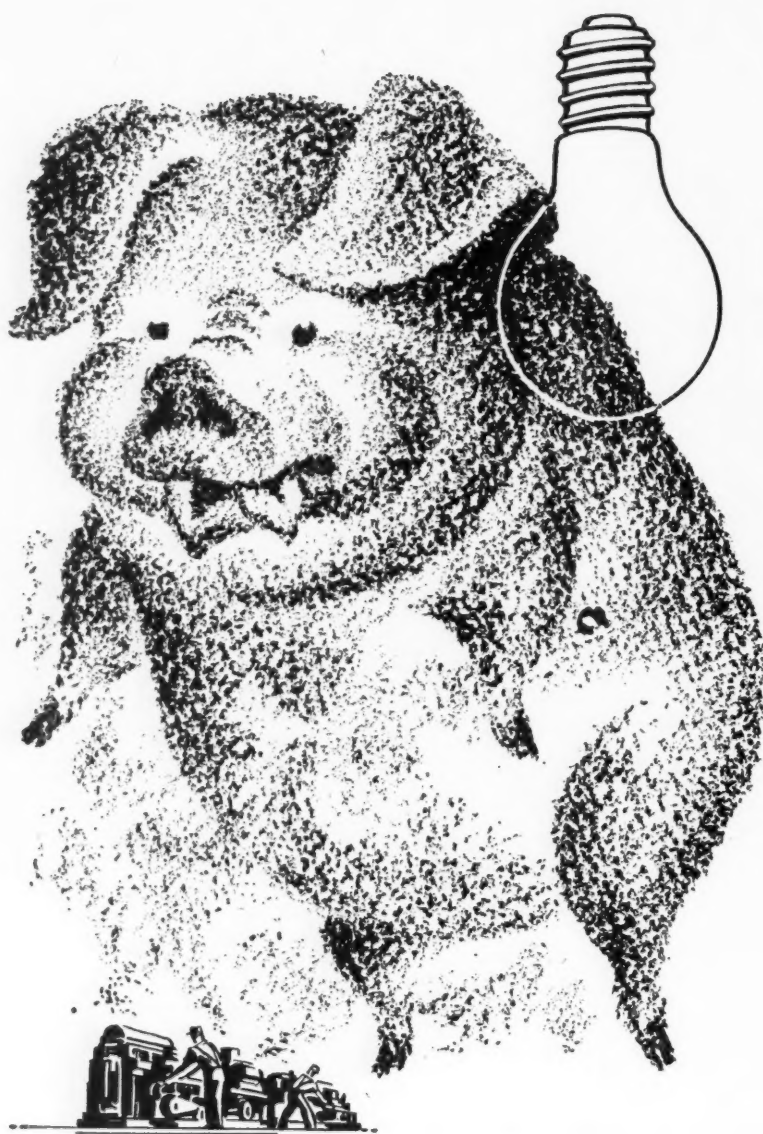
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Coal Publications

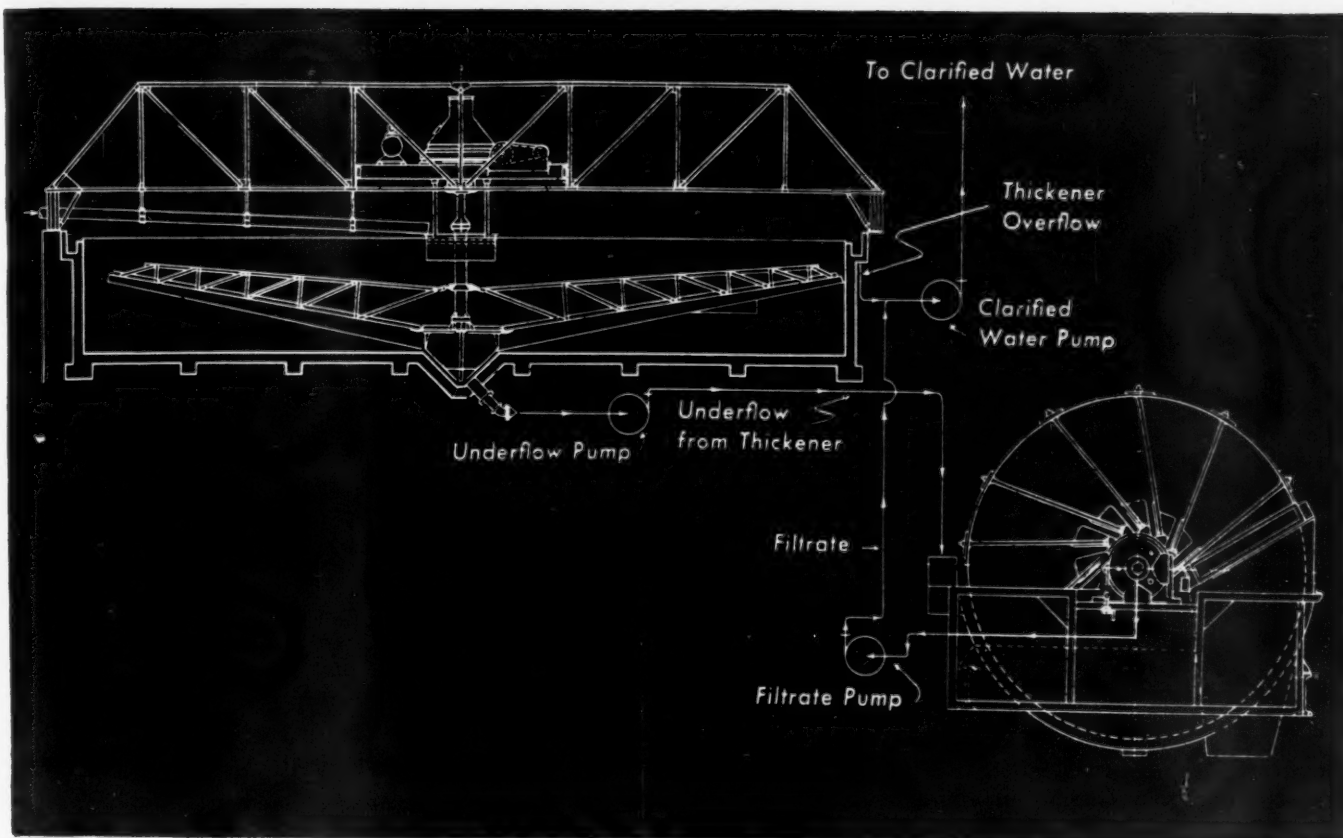
Inspection Standards for Strip Mines (Coal and Lignite) Revision of standards issued October, 1945, U. S. Bureau of Mines, I. C. 7350; 32 pp., 8x10½-in., paper, mimeograph; free*. In all, 271 tentative standards are included, covering not so much the excavators and their operation, but rather the tippie; coal-preparation, steam and compressor plants, washhouses, supply houses, refuse dumps, fire prevention, explosives and blasting, haulage, inclines, pit haulage and electricity. Standards advocated are sloping highwalls, disposal of all spoil securely behind top of cut on sides of all deep box cuts, erection of danger signs at cross roads, provision of footways up highwalls where men have to climb them frequently and the covering of all vertical drillholes or their blanking by leaving in them at least 12 in. of protruding casing. Nothing is said as to the operation of the strip shovel or drag scraper, its bucket or ropes, or about the men working around the excavator.

Wetting-Agent Concentration in Water Solution Determined by the Drop Number Method, by John P. Harmon, U. S. Bureau of Mines, I. C. 7351; 6 pp., 8x10½-in., paper, mimeograph; free*. A Traube stalagmometer, a glass tube with a marked constriction to 0.03 in. and a large tip perforated by an opening of almost equal diameter, is used to determine wetting characteristics. The number of drops formed from a given volume of liquid is a function of surface tension and the time required for a given volume of liquid to drop from the tube is a measure of the viscosity of the resulting liquid.

Electronic Chronoscope for Measuring Velocities of Detonation of Explosives, by C. R. Nisewanger and F. W. Brown, U. S. Bureau of Mines, R. I. 3879; 9 pp., 8x10½-in., paper, mimeograph; free*.

Mine-Rescue Life-Line Telephone Assemblies, by J. J. Forbes, F. E. Griffith, F. E. Cash and M. S. Peterson, U. S. Bureau of Mines, R. I. 3875; 23 pp., 8x10½-in. paper, mimeograph; free*. This assembly is in use by a company in the Lake Superior district where methane is absent and sparkproof batteryless or permissible rescue equipment is not needed. Men using normal oxygen apparatus cannot make sounds with the lips, particularly those of letters p, b, m, f, v or w, but they can be asked questions to which they can respond by saying yes or no. They can talk by a code using the words one, two, three or four, instead of more lengthy and indistinguishable answers, such as stopped or at rest, crew advancing, crew retreating, and distress, send reserve crew, respectively. By modifying the oxygen apparatus to admit of relatively free movement of the lips, the articulation of a man using the apparatus can be improved so that he can report directly to the fresh-air-base-phone attendant, and can do it in an atmosphere containing only 1 percent of oxygen and a high percentage of methane.

Proceedings of Illinois Mining Institute, 171 pp., 7x9½-in., imitation cloth. B. E. Schonthal, 28 East Jackson Boulevard, Chicago, 4. Safety, lubrication, evolution of mine coal cutters, underground lighting, drilling, prefabricated track, freezeproofing



An Efficient Team For a FINE COAL DEWATERING PLANT

The system illustrated, or one providing for further concentration, will soon have to be a part of every modern coal washing plant.

As designers and builders of thickeners, hydro-separators and vacuum filters—important elements of a fine coal dewatering plant—General American can recommend the equipment best suited to the particular problem involved—for some, the elimination of stream pollution; for others, the recovery of marketable coal.

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-- AND NO TIME OFF

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This Gorman-Rupp self-priming, centrifugal pump is simple in construction and built for mine-gathering service.

- It is a lot of pump in a small package and especially suitable in mine locations where space is cramped.
- Ideal for remote locations or automatic operation as no adjustments are required between prime and run.
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- This pump will handle any solids or foreign matter that will pass the intake strainer without clogging or damaging the pump mechanism.
- There is only one moving part, the impeller. This turns at motor speed to eliminate reduction gears and other wearing parts.

Made in various sizes in capacities from 4,500 to 15,000 gallons per hour and heads up to 125 feet.

Write today for a copy of our special mine bulletin MP-2.



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of coal, seven war years in coal mining, ventilation, machine mining, mine-scale operation, are subjects treated.

• *Minerals Review of Latin America, 1939-44, Foreign Minerals Survey, Vol. 2, No. 4, U. S. Bureau of Mines, 111 pp., 8x10 1/4-in., with 5 folded inserts; mimeograph, paper, free*.* A regional review of mineral resources, production and trade. Argentina in 1943 produced 56,387 tons of highly altered asphaltites listed as fuel, and 4,845 tons of lignite; Brazil 1,555,993 tons of coal; Chile 2,029,966 tons of coal and lignite; Colombia 475,669 tons of coal; Ecuador, 109 tons of coal; Mexico, 1,053,485 tons of coal; Nicaragua, 1,267 tons of coal; Venezuela, 11,400 tons of coal. The tons are metric of 2,204 lb., practically long tons. Other countries other than those mentioned do not produce coal or solid fuels. Estimates of reserves in tons are not given.

*Apply U. S. Bureau of Mines.

Smoke Ordinance Passed in Columbus

An ordinance designed to reduce the smoke nuisance to a minimum and providing fines ranging from \$10 to \$200 for violators was approved in Columbus, Ohio, April 30, effective in 30 days. The ordinance was drafted by a special smoke abatement committee headed by Ralph Sherman, Battelle Memorial Institute, and calls for annual inspections of all fuel-burning equipment except that in private homes and locomotives. Two five-man boards are created, one to advise the chief smoke inspector and the other to hear appeals from decisions of the engineer. A companion bill setting up salary scales for the inspection staff is to be held until appointment of a chief smoke inspector.

Carbonization Process Ready for Test

After some seven years of experimentation and pilot plant work, the patented low-temperature coal carbonization process developed by Coal Logs Co., Inc., Salt Lake City, is now ready for test production in a new semi-commercial plant in north Salt Lake City. Inventor of the basic process is K. L. Storrs, now president of the firm, while George W. Carter, department of mechanical engineering, University of Utah, is chief engineer in charge of all experimental work. Extensive pilot plant tests have convinced the inventors that this low-temperature carbonization process for making smokeless fuel, unique in a number of features, is both technically and economically sound. As a result of an investigation of the process by the State of Utah over a period of two years, the firm is under contract with the state to operate the Salt Lake City plant, now over 90 percent completed, for the treatment of 50 tons of raw coal daily.

In addition to the semi-commercial low-temperature carbonization plant, Coal Logs Co. is ready to operate at the University of Utah a pilot plant to produce continuously high-temperature metallurgical-grade coke from about 200 lb. of raw coal per hour.

How the method of stripping lowers costs!



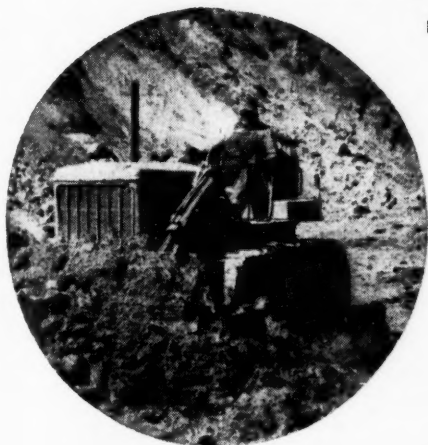
1. *Reduces Your Original Investment.* By using LaPlant-Choate scrapers in combination with your present tractors you can handle your complete stripping operation—loading, hauling and spreading—without going to the extra cost of separate “one-purpose” outfits.

2. *Saves on Operation and Maintenance.* Since only one operator is required for each tractor-scraper rig you naturally save on manpower. And, of course, fewer rigs (as compared with shovels and trucks) mean lower operating and maintenance costs.

3. *Provides Increased Job Flexibility.* Unlike a shovel or drag line, a tractor-scraper rig can strip off any amount of overburden—several inches or 50 feet—a small pit or several hundred thousand yards. The same rig can also be used for building and maintaining roads, emergency loading, hauling, etc.

4. *Fits Any Kind of Dump Problem.* With a tractor-scraper rig you can dispose of overburden wherever it works out best — on the bank, in a mined out pit or waste area — or spread it in thin, compacted layers for landscaping.

5. *An Economical Rig for Every Job.* LaPlant-Choate scrapers are available in capacities from 2 to 14 cubic yards (struck measure) for use with all makes of crawler tractors. In addition, the 2 and 4 yard outfits can also be used with high speed rubber-tired industrial tractors. For more details, see your LPC distributor or write: LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Avenue, Oakland, Calif.



• Use LPC hydraulic dozers for short-haul stripping, levelling, clean-up and other utility jobs. Remember, hydraulic dozers are tops in mining and LPC is tops in hydraulic dozers.

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for Lowest Possible Cost
in Moving Earth



Equipment News

Greasing Truck

Lee-Norse Co., Charleroi, Pa., offers a new mobile greasing truck carrying six barrels of lubricants for lubrication of mining equipment at the face. There are three separate compartments, one each for hydraulic oil, transmission lubricant and chassis lubricant. The truck is equipped with a motor-driven air compressor and air-operated grease pump and pressure gun, and it is a complete lubricating service station on wheels, according to the manufacturer.

Electrical Connectors

Ideal Industries, Inc., 1013 Park Ave., Sycamore, Ill., offers a new line of split-bolt and service-entrance connectors, to supplement its line of wire connectors and lugs.

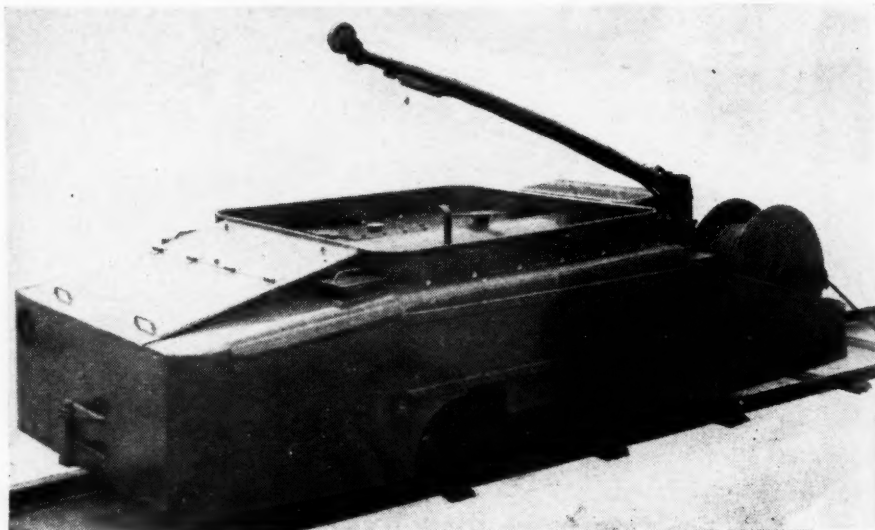
The split-bolt connectors are available in one-piece and two-piece styles with small and large heads in bronze, brass or aluminum. These connectors are precision made from high-quality material, with no burrs, ends, or sharp edges to catch in the lineman's gloves and uniform contact surfaces, according to the maker, assure maximum conductivity and low resistance. A wide range of sizes accommodates all solid and stranded wire from No. 6 to 1,000,000 cir.mil. The service-entrance connectors are made from cold-drawn copper with screws of Everdur. There are five sizes—from No. 12 solid or No. 10 stranded to No. 2 stranded.

Anti-Corrosion Paint

New applications of Resoweld—a wartime development of the Goodyear Tire & Rubber Co., Akron, Ohio, for treating crude-oil storage tanks—have been found in ceilings, beams and other surfaces exposed to corrosive attack. It is said to have exceptional resistance to acids, alkalis and salt solutions and to be insoluble in aliphatic solvents (gasoline, naphtha), water and alcohol. The protective paint may be applied by spraying, brushing or dipping and can be satisfactorily bonded to metal, concrete and wood, the company points out. Maximum efficiency in combatting corrosion, as well as maximum adhesion, is attained by baking the films.

Lubricant

I. P. Leadolene, described as an indestructible pH-ilm lubricant developed to meet the requirements of new production methods



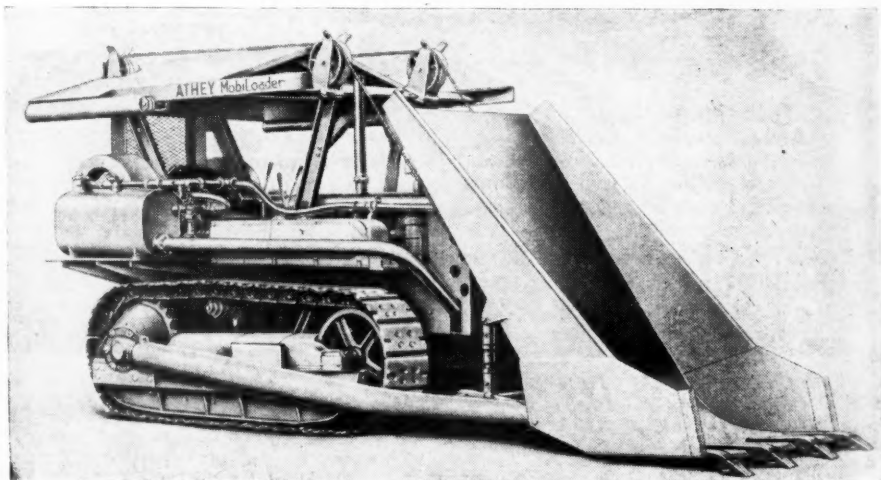
at increased speeds, greater pressures and high heat conditions, is now offered by the Brooks Oil Co., 315 East Carson St., Pittsburgh, Pa.

I. P. Leadolene has a high film strength, according to the manufacturer, and its high degree of adhesiveness enables it to adhere to metal surfaces, thoroughly wetting them and preventing creepage and wiping action under extremely high pressures. I. P. Leadolene successively repels water, is not easily emulsified, and retains its stability in service and in storage. It lubricates successfully at low temperatures as well as high, and will not fail when temperatures unexpectedly change. It protects against corrosion by air, water and many kinds of fumes. A bulletin illustrating applications of this lubricant is available on request.

Loader

Athey Products Corp., Chicago, Ill., announces a new MobiLoader, known as the Model W4-5, for the "Caterpillar" wide-gage D4 tractor. It incorporates, according to the company, a new and exclusive application of hydraulics with a single finger tip control that results in the instant response to the full power of the tractor. It is said to eliminate fatigue and increase loading efficiency.

The overhead-loading principle of straight-line production is retained in this machine, and it is stated that improvements in design result in greater visibility while its streamlined mounting permits full accessibility to the tractor engine. Weight saving has been incorporated with strengthened design of





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J&L WIRE LINES
 PERMASET PRE-FORMED

ON WORLD'S LARGEST CAPACITY DRAGLINE

For dependable service and long rope life J&L Precisionbilt Perma-set Wire Rope was specified for use on this and other identical draglines for uncovering and digging coal. The twin 260 ft. lengths of 2½ in. 6 x 19, Independent Wire Rope Center, Right Lang Lay Drag Cables are used to pull a huge 26½ yard bucket weighing 73 tons loaded. The repeat orders from this and other draglines prove that J&L Wire Rope gives outstanding service. J&L also makes Precisionbilt Wire Rope for all coal mining operations. Write for further information.

**J&L
STEEL**

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GILMORE WIRE ROPE DIVISION

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J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

parts subject to greatest stress. Particular attention has been given to a balanced mounting on the tractor for greatest traction and minimum wear on idlers and rollers. Interchangeable bucket equipment is available in sizes for various types and weights of material, and an interchangeable bulldozer blade can quickly be installed.

Power Shovel

The Buckeye Traction Ditcher Co., Findlay, Ohio, has announced that their Model 70 Clipper $\frac{3}{4}$ -yd. power shovel will be available with 22-ft.-long boom and 17 ft. 4-in. dipper stick. The boom is 4-ft. longer than the conventional model and the dipper stick is 3-ft. longer. This "High Lift" Clipper provides deeper digging, higher dumping and a greater digging radius, according to the company, which makes it ideal for clay winning, coal and other stripping jobs, gravel-pit work, deep-excavation work, high stockpiling and borrow pile operations. The extra reach of the "High Lift" Clipper means more yards per shift through fewer moves and the long crawlers and wide crawler treads provide sure footing. Coupled with correct balance, the long boom and dipper stick can be used to full advantage without sacrificing stability, it is said.



with either natural or GRS synthetic rubber, and has much more resistance to cutting and chipping, the company states.

Track Cleaner

A mine-track cleaner, said to load a ton of dirt per minute, has been announced by the American Mine Door Co., Canton 6, Ohio. In the illustration, the machine is shown with digger points lowered and plow shares extended for operation. When tramming, the plow shares are drawn in and the digger points elevated to pass over frogs, etc. Either plow share may be adjusted, in or out, up or down, independently of each other. The digger points, in operation, are lowered to just clear the top of the ties.

The front conveyor, provided with angle arms, carries the dirt and rock upward and backward to the boom conveyor. The forward

ward-frame work of the front conveyor is of floating construction and rises if too large a rock should be moved. The angle pieces on the elevator chain alternately slant to the right and left, which tends to move heavy pieces from side to side to avoid clogging. The car is spotted beneath the boom. After the rear is filled, the dirt is dragged forward by the conveyor chain to the front until car is filled. A hydraulic lift lifts the digger points to pass over frogs and switch points and a lever is operated to quickly lower the points. A safety lock is provided to prevent the digger points from dropping while the machine is being trammed.

The machine can be started or stopped by push buttons from either side of the machine and a third button is attached to the trailing cable to permit the motorman also to stop the machine, as he is in the best position to observe any obstructions. The machine is pulled by a locomotive. The boom is designed to be built to the proper

Excavator

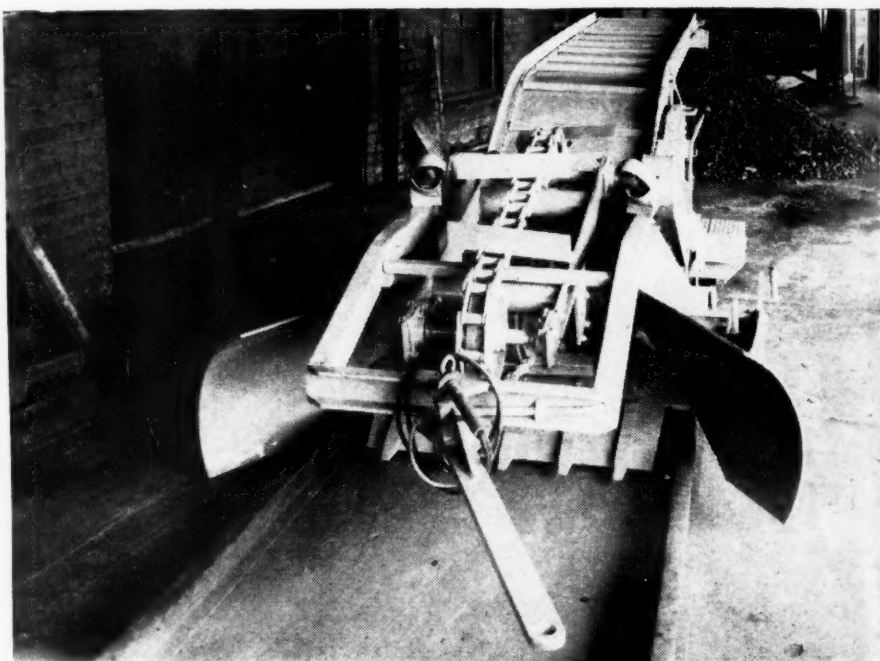
Trackson Co., Milwaukee 1, Wis., announces the addition of the Model IT4 to its line of Traxcavators mounted on and powered by the "Caterpillar" Model D4 track-type tractor. Said to retain all the Traxcavators' basic operating and performance features, Model IT4 includes many improvements that insure greater output at lower net cost per yard. The standard bucket has a capacity of 1 cu.yd. and is said to be ideal for digging, excavating, grading, loading, material handling and all general uses.

The IT4 not only excavates and digs big yardages in tough soils, dumping directly into trucks or carrying its loads when necessary and dumping, casting, spreading or stockpiling as desired, but will also ditch, cast, carry, spread, strip, bulldoze, backfill, level, landscape, terrace, remove snow, etc. A bulldozer blade, quickly installed in place of bucket. Anglegrader and other attachments are available. Bulletin 895, describing this model, is available from the manufacturer.

Oil-Resistant Tires

Industrial tires made with a special synthetic rubber compound to resist the destructive action of oils, greases and salt brine, as well as other severe service conditions, are announced by the B. F. Goodrich Co., Akron, Ohio. The special compound can be furnished on industrial tires of all standard sizes, in both the Vule-On and Pressed-On types manufactured by the company.

In addition to resisting the destructive action of oils, greases and brines, the new compound has less rolling resistance than regularly constructed industrial tires made



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WHERE LIGHT IS NEEDED

more brilliant
more effective
completely reliable

*plus comfortable, safe
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Light the way to safer production with Edison Electric Cap Lamps—sturdy, powerful, built for the most rugged mining service, furnishing high illumination better directed to the job!

Unfailingly dependable in operation, Edison Lamps enjoy top popularity in modern mining. When worn with M.S.A. Comfo Caps for all-around head safety, they supply the miner with personal protection that is continuously effective throughout every shift. *Demonstrations gladly arranged on request.*

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finished. Cored stock all

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shrinkage, hence a better
contact with supporting shell;
a more solid, rigid bearing.
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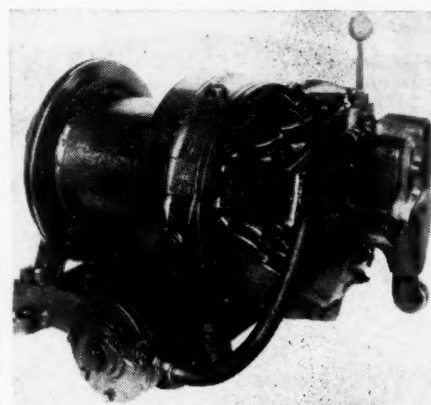
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height of the cars, but is adjustable to a limited degree. The track cleaner will remove the dirt between the rails of the track, no matter how hard, and to a distance of 34 in. from the center of the track, according to the manufacturer.

Hoist Safety Brake

An important safety feature now available on the Model HKK hoist for use with timber, steel, powder and other supplies, just announced by the Gardner-Denver Co., Denver, consists of a spring-loaded brake held in the off-position by air pressure. If the air supply fails for any cause, an air hose ruptures or a line breaks, the brake is auto-

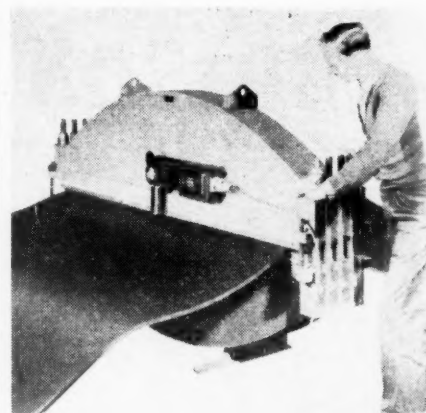


matically applied. It is automatically released when the throttle valve is moved in either direction. The throttle valve will automatically return to the neutral position when released by the operator.

The new brake is declared to be positive and entirely automatic. It will hold in suspension any load within the capacity of the hoist and cannot be released until air is admitted to the motor and the load is picked up. The Model HKK single-drum safety hoist has a rated vertical lift of 2,000 lb. at 80 lb. air pressure.

Belt Vulcanizer

James C. Heintz & Co., Cleveland, Ohio, has just completed a belt vulcanizer reported to be the world's largest. With a platen 7 ft. across and 1 ft. wide this giant will vulcanize a belt 6 ft. wide and of any thickness, the company states. The vul-



Make up for Lost Time with **ATHEY MOBILOADERS**



STRIP MINE OPERATORS everywhere are making up for lost time by putting fast, big-capacity, Athey MobiLoaders on the job to help assure high production of urgently-needed coal.

One reason why Athey MobiLoaders have proven themselves the efficient, economical, fast method of loading coal on strip mining operations, is that they eliminate the need for shooting. The accompanying photograph shows how big chunks of coal are loaded quickly at the front,

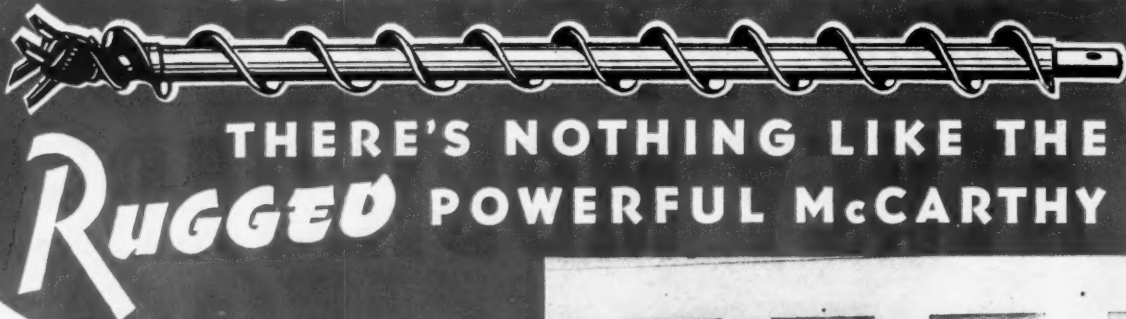
carried in reverse to the truck, then discharged overhead so that the tractor can return for another heaping load without any time lost in turning.

Your Athey-"Caterpillar" distributor has complete specifications and other information on how you can save time and money with Athey MobiLoaders. See him soon, or write direct to Athey Products Corporation, 5631 West 65th Street, Chicago 38, Illinois.



DEPENDABLE LOADING & HAULING EQUIPMENT

FOR HORIZONTAL DRILLING



● Designed by a Strip Mine Driller who *knows* what operators want in drilling machines, the McCarthy Rock Boring Machine delivers 40% more holes per day . . . and here's why:

Hydraulic feed plus fingertip control.

Individually operated jacks, designed for safety and convenience, enable operator to drill holes exactly where required.

Because of patented design of hydraulic ram, McCarthy Machine requires less working space and has the necessary weight (3500 pounds) to operate faster and more economically.

Handles 7" augers readily.

Bores up to 9" diameter holes to horizontal depth of 150 ft. in earth or rock formation.

Operates effectively in coal, clay, sandrock, and limestone overburdens.

Adjustable to necessary drilling angle.

Easily movable from job to job.

Available in either truck, trailer, or self-propelled types.

PHONE • WIRE • WRITE

In sending inquiries, please give us details on your drilling depths and type of job so that we can furnish complete, accurate information.



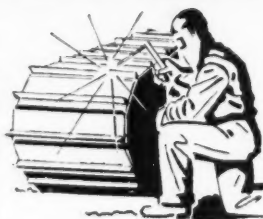
Introduced less than two years ago, the McCarthy Rock Boring Machine—shown here mounted on a truck—has broken all records. This machine eliminates the guesswork from horizontal drilling.

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Drilling and earth boring specialists. We manufacture all types of augers from 1/4" to 9" Dia. and a complete line of mining tools and supplies.

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P&H also makes other electrodes in all types and sizes — AC or DC — for welding all steels and for building up and hard surfacing.

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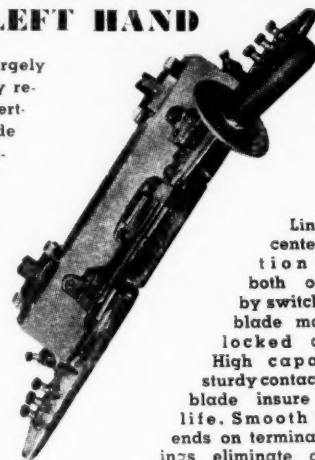
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A very popular switch largely due to being completely reversible. Can be converted for trolley on either side of track by merely removing one bolt and reversing handle.

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Line and center section are both opened by switch, and blade may be locked open. High capacity, sturdy contacts and blade insure long life. Smooth V cut ends on terminal castings eliminate arcing.

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JOHNSTOWN PA.

canizer weighs more than 3,000 lb.

The huge platens, on "flat irons," each contain over 1,000 sq. in. and exert a minimum pressure of 100 lb. per square inch. This high pressure gives the smooth even cure necessary to insure a smooth-running belt. Platen temperatures of 287 deg. under operating conditions are automatically controlled with a variance of less than 6 percent at any point of the platen area, it is claimed. The belt ends to be spliced are properly matched or overlapped and the platens tightened down to hold the belt in the proper position and supply the correct pressure. The curing angle runs at 14 percent to a line drawn perpendicularly across the belt. Any size repairs or splices can be made merely by making the required number of cures.

Pneumatic Wrench

A new Thor pneumatic impact wrench for driving and removing nuts, bolts and cap screws up to $\frac{3}{8}$ -in. thread size is announced by the Independent Pneumatic Tool Co., Chicago. Rotatively striking impact jaws, set at a wide radius from the spindle shank that delivers the blow close to the work, are the principles in the new impact mechanism. Elimination of fastenings in the mechanism and compact, streamlined design of housings, it is stated, reduce weight to 3 $\frac{3}{4}$ lb. and length of the tool to 5 $\frac{7}{8}$ -in. for comfortable one-hand operation with greatly reduced torque reaction.

D. C. Rectifier

A new line of rectifiers, designed to convert a.c. into d.c. for industrial and foundry use in energizing such equipment as magnetic separators and lifting magnets, is now available from the Mellaphone Corp., Rochester 2, N. Y. Tubes are mounted outside the main housing and protected by a perforated metal grill, to insure proper ventilation and freedom from arc-backs under full load. Standard models are in stock for nearly any standard voltage and current requirement.

Fire Extinguisher

Randolph Laboratories Inc., 8 East Kinzie St., Chicago 11, Ill., has introduced a new trigger-touch 15-lb. CO₂ extinguisher that



COAL AGE • June, 1946

Lee-Norse GREASING TRUCK



The Modern Mobile Greasing Station

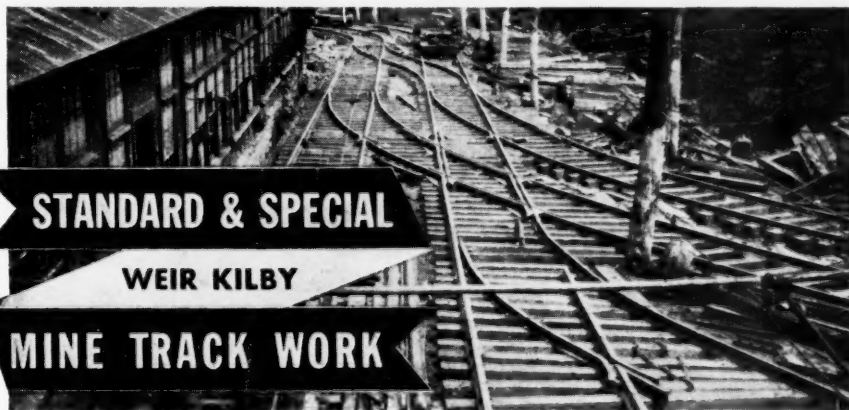
• This modern greasing station on wheels carries Hydraulic oil—Transmission—and Chassis lubricants to the mining machinery at the face. . . . It is fully equipped with air operated grease pump and pressure gun and separate motor driven air compressor. . . . It enables you to apply correct lubricants—easily

—quickly—and to keep your mechanical equipment in better shape thus eliminating costly break-downs and repairs.

We also specialize in complete factory rebuilding and overhauling of Loaders—Cutters—Shuttle Cars and other Mining Machines.

PHONE
CHARLEROI
750

Lee-Norse Company
CHARLEROI, PA.



STANDARD & SPECIAL

WEIR KILBY

MINE TRACK WORK

One of the surest ways to speed up coal production in these days of phenomenal demand, is to plan at once for the most efficient possible trackage, inside and outside the mine. Weir Kilby has developed many light weight and medium weight elements of track work especially for the mines.

We constantly carry in stock hundreds of mine turnouts, complete with Weir Titan Frogs, switch points, and stands in the standard angles and various rail sections, so as to facilitate immediate shipments. For other needs, your orders will be made up in the shortest possible time.

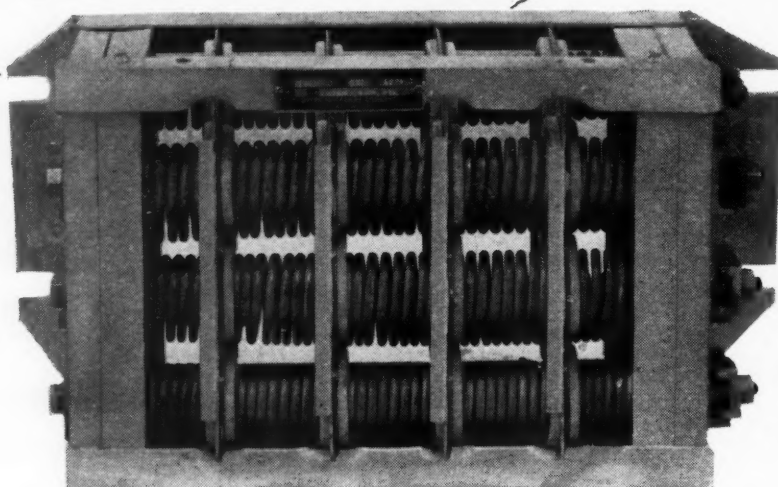


CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION
CINCINNATI 12, O. BIRMINGHAM 7, ALA.

MINING MACHINE *resistances*



GUYAN
MACHINERY
COMPANY
Logan
W. Va.

Let us know the model and make of your mining machines and we'll furnish Guyan Resistance units with the same number of taps, numbered the same as the original wiring diagram and with bolt holes that line up!

Write for the Guyan Catalog now.

2 *Champions* AMONG RAIL BONDS



MESCOWELD M8-F

Separate Joint Bond for straight line welding. Terminal has an extra pocket which increases the welding area about 15% and lowers current resistance.



MESCOWELD M5-F

Can be used on top base of any size rail. Terminal hook holds bond in place while weld is being made. Solid terminal prevents installation damage.

The M8-F and the M5-F are two of the fastest selling rail bonds in the mining industry—because of their adaptability and superior performance. Write for literature describing these and 16 other types of MESCOWELD Rail Bonds.

IMMEDIATE DELIVERIES

MOSEBACH ELECTRIC & SUPPLY CO.

1115 ARLINGTON AVE. PITTSBURGH, PA.

TELEPHONE HEMLOCK 8332

it states is carried and operated with uninterrupted single-sweep action. By grasping the unit by its arched-steel handle, the operator removes the extinguisher from its bracket and carries it with only one hand, leaving the other arm free to remove obstacles and open doors. On approaching the fire, the operator grasps the nozzle handle with his free arm and aims it at the base of the flames. One touch of the thumb-trigger discharges the carbon dioxide gas and release of the trigger automatically stops the flow, saving the remainder of the charge.

Portable Fountain

A new portable drinking fountain fitted with a salt dispenser to provide fresh water for crews working at remote points and in the field where they do not have access to fixed drinking fountains is offered by the



Dobbins Mfg. Co., Elkhart, Ind. The portable equipment has a tank with a capacity of 4 gal., and is equipped with loops for carrying straps and mounting brackets for salt-tablet dispenser, each of which will hold 500 tablets.

Prime Mover-Scraper

Limited production of a new high-speed rubber-tired prime-mover and 15-yd. scraper combination has been announced by LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. Full scale production is scheduled to begin in 1947.

In announcing the development of this new high-speed rubber-tired earthmover, LaPlant-Choate states that it has obtained comparative costs of earthmoving with various combinations of equipment that show conclusively that more power, bigger tires and higher traveling speeds pay dividends in lower net costs.

Slide Rule

To fill the need for a slide rule of greater dimensional stability, the Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago

How Pre-Engineering Prolongs Conveyor Belt Life

Proper alignment, safeguard of belt life, is *built into* Barber-Greene Conveyors before they leave the factory. Drive ends and take-ups are assembled correctly and completely . . . thoroughly checked and tested . . . accurately rated for horsepower or load.

Frames and carriers are *pre-fabricated* . . . delivered to you as complete, self-contained units. Erection is merely a matter of bolting the *standardized* units together.

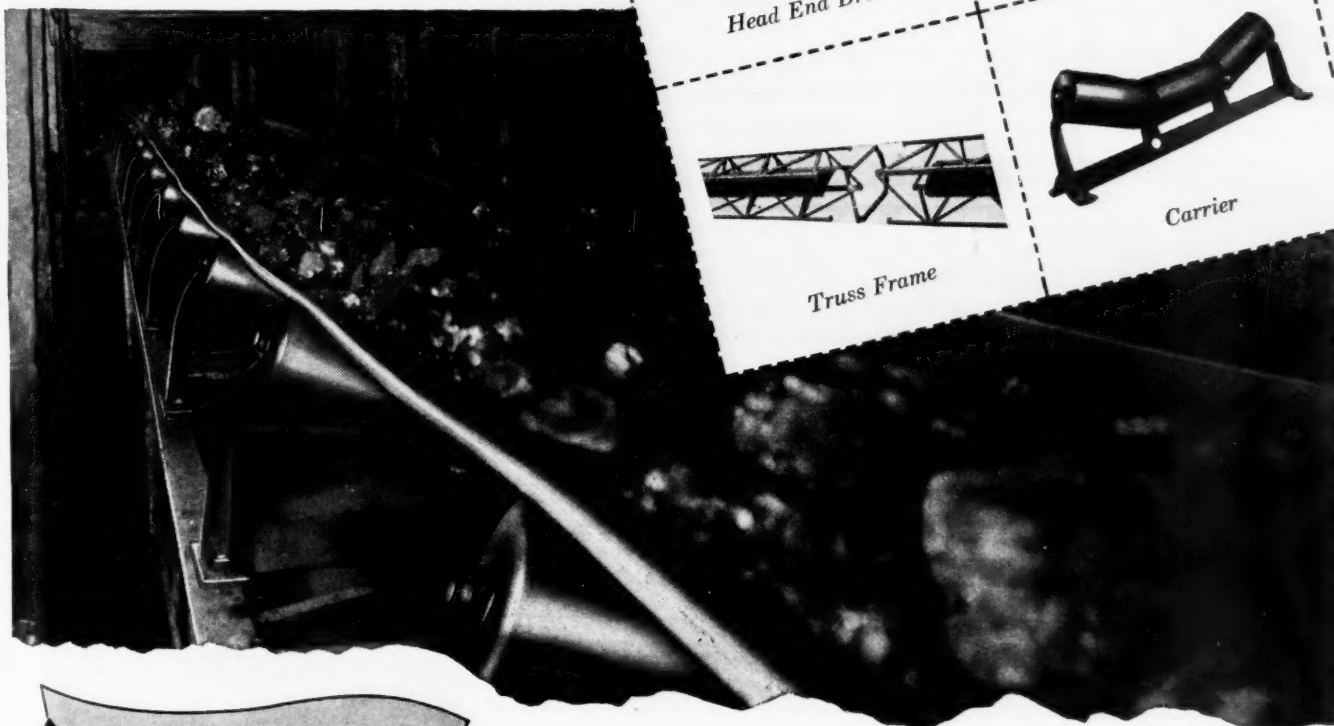
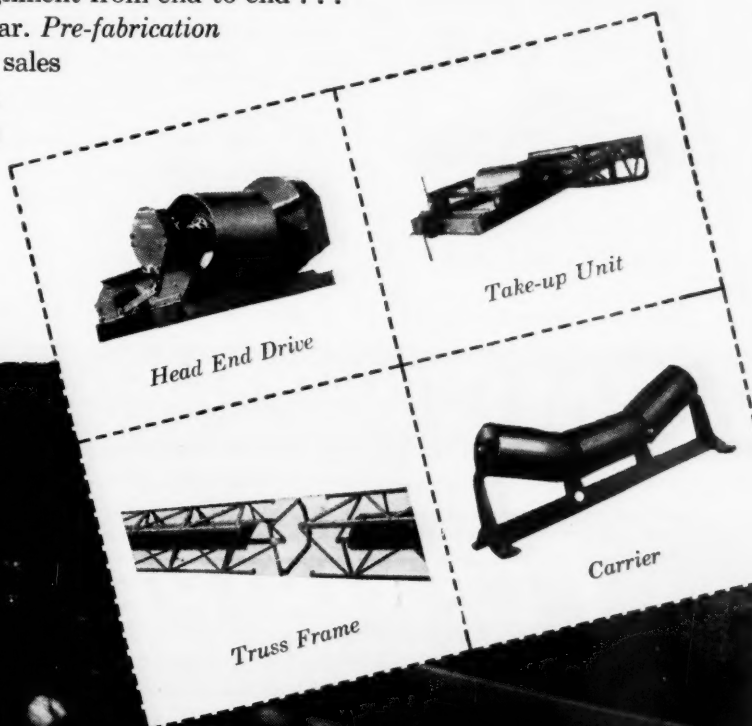
Barber-Greene *pre-engineering* brings smooth, dependable operation on the job. Precision construction assures correct alignment from end to end . . .

reduces maintenance costs and cuts belt wear. *Pre-fabrication* reduces manufacturing delay . . . permits our sales

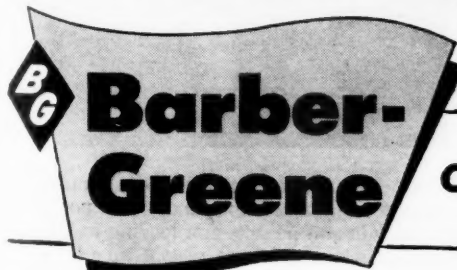
engineers to give you a prompt quotation.

When the time comes for the mechanization of your mine, get complete details on the B-G Conveyor system.

Barber-Greene Company,
Aurora, Illinois.

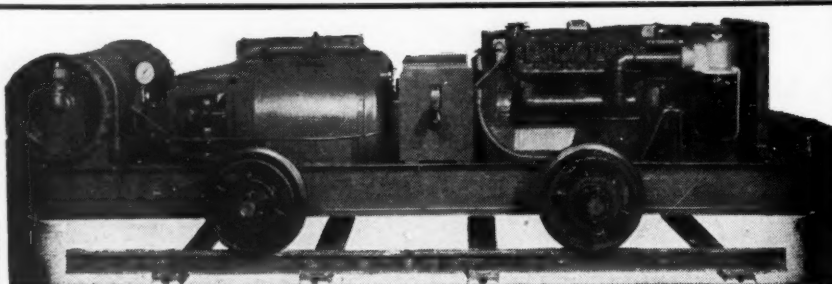


46-7



CONSTANT FLOW EQUIPMENT





ACME "LOWBOY" Model 110 MINE CAR AIR COMPRESSOR

Just ask for
BULLETIN 3920

For full particulars on construction,
operation, and general specification.

The Model 110 Acme "Lowboy" Mine Car Air Compressor is designed to meet the mining conditions existing today, especially in mechanized mining.

Low—compact—light weight—it is adaptable to both high and low seam operations and offers the additional advantage of efficient, economical service.

Designed particularly for mine service the unit is an adaptation of the Schramm Fordair which has proved highly efficient and dependable in many fields of service.

Its mechanical simplicity—portability—and rugged construction make it ideal for mine use.

ACME COMPRESSOR CO.
Williamson, West Virginia

FLEXIPIPE

The improved flexible tubing for
mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by a more rigid means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.

412 Poplar Street, St. Louis 2, Mo.

MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.

Strong, Simple, Low maintenance cost.



Extra-long journalsprings assure better trackability.

Large motor, to assure more horsepower per ton weight of locomotive.

Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons—either single or double motor-drive—16" to 56½" track gauge.

All Greensburg Locomotives are CUSTOM-BUILT to your requirements

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.

41, Ill., has introduced a new 10-in. rule made of a plastic material. The precision graduations are not affected by temperature change, it is said, and the glass indicator is mounted in a polished stainless-steel frame that holds it firmly in place. The graduations are precise and will not lose visibility through use. The CI scale shows numerals and graduations in red to provide ease of reading.

First-Aid Heat Block

The Redi-Heat Block, a new rapid and safe emergency source of heat for first-aid use employing no liquids of any kind, has now been made available by the Mine Safety Appliances Co., Pittsburgh. Entirely self-contained and always ready for instant use, it requires only one minute to reach top heat, the company states. Wrapped in a towel or blanket, the block maintains its temperature for approximately one hour and furnishes completely safe heat for emergency treatment of victims of shock or other injury. The replaceable charge is quickly and easily inserted in the block, where it is activated by simply raising and releasing a spring-loaded lever. Weighing only 22 oz., the block fits conveniently into industrial first-aid kits, cabinets, dispensaries and field-station units.

Grease-Gun Loader

Loading of hand guns, long a vexing and often wasteful problem to users of pressure-lubrication systems, has been resolved into a simple, clean and quick operation, according to an announcement of a new gun-loader fitting by the Alemite division, Stewart-Warner Corp., Chicago. The new method eliminates disassembly of the hand gun, pre-



cludes danger of lubricant contamination or waste, eliminates annoyance of air pockets in the gun and permits gun loading in a few seconds rather than the several minutes required by previous methods, Alemite engineers declare.

The new gun-loader fitting, mounted on the head of a hand gun, permits grease to flow into the grease reservoir of the gun in the same manner that it flows into a bearing



Willison Automatic Coupler with simple spring draft gear. Available also with *National* friction draft gear.

You can INCREASE your OUTPUT with Willison Automatic Couplers

One way to help catch up on production is to take advantage of the benefits of Willison Automatic Couplers for your mine cars. With this equipment, you gain:

Safer operation—coupling and uncoupling without going between cars.

Faster handling of large capacity cars.

Faster shunting and gathering.

Less coal spillage.

Operation around sharp curves.

No uncoupling on rotary dumps.

These improvements in speed and safety have been well demonstrated by progressive mine operators—and you will obtain the same profitable results with Willison Automatic Couplers.



NATIONAL

MALLEABLE AND STEEL CASTINGS CO.

Cleveland, Ohio

Sales Offices: Cleveland, Chicago, New York, Philadelphia, Richmond, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.



Parmanco

MECHANICAL FEED HORIZONTAL DRILL.

Heat-treated gears are used in this transmission and spur gear reductions, with an ample factor of safety for the operation of machine under all conditions. Link-Belt bearings of extra size are used throughout. Augers are connected to main drive shaft through a self-aligning chuck of ample size, in which is secured the drive shaft by two shear pins which provide sufficient safety to rest of machine. The machine is raised or lowered to a height of 36 inches by jacks on front of machine, and rear of machine is mounted on two pneumatic-tired wheels which also have a 36-inch range of adjustments. The machine permits the drilling of a controlled-angle hole, which makes possible a great saving in the use of explosives through the cantilever effect of this controlled-angle drilled hole.

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

through a lubrication fitting in normal lubrication. A loader valve mounted on a bucket pump or loader pump is the companion item to the loader fitting on the hand gun.

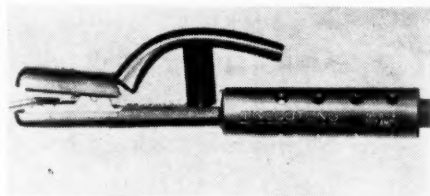
While several hand guns, both push-type and lever-type, as well as loader pumps of 25-, 35-, 100- and 400-lb. capacity, all equipped with the special fittings and facilities required by the new gun-loading system, were announced as available, users of guns and bucket pumps already in the field can convert their equipment to the new system. The new items include: high-pressure, push-type guns, 9- and 18-oz. capacity; low- and high-pressure lever-type guns, 21-oz., capacity; portable loader pump, 35-lb. capacity; and loader pumps for loading guns directly from original 25-, 100- and 400-lb. lubricant containers.

In addition to the new guns and pumps, a loader valve, No. G-306740, to convert present guns to loader operation is available. It can be installed in either lever- or push-type guns simply by drilling and tapping a $\frac{3}{8}$ -in. pipe thread. A loader kit, No. G-306910, containing all necessary parts to convert any bucket pump into a loader and including one loader fitting for a hand gun also is available. A bracket to hold a gun on the side of the bucket is included in this kit.

Electrode Holder

A complete new line of manual arc-welding electrode holders, known as Twecotong, has been announced by the Tweco Products Co., Wichita 1, Kan., and includes full-insulated and semi-insulated models.

The full-insulated models are No. A-14, 300 amp., $\frac{1}{4}$ -in. electrode; and No. A-38,



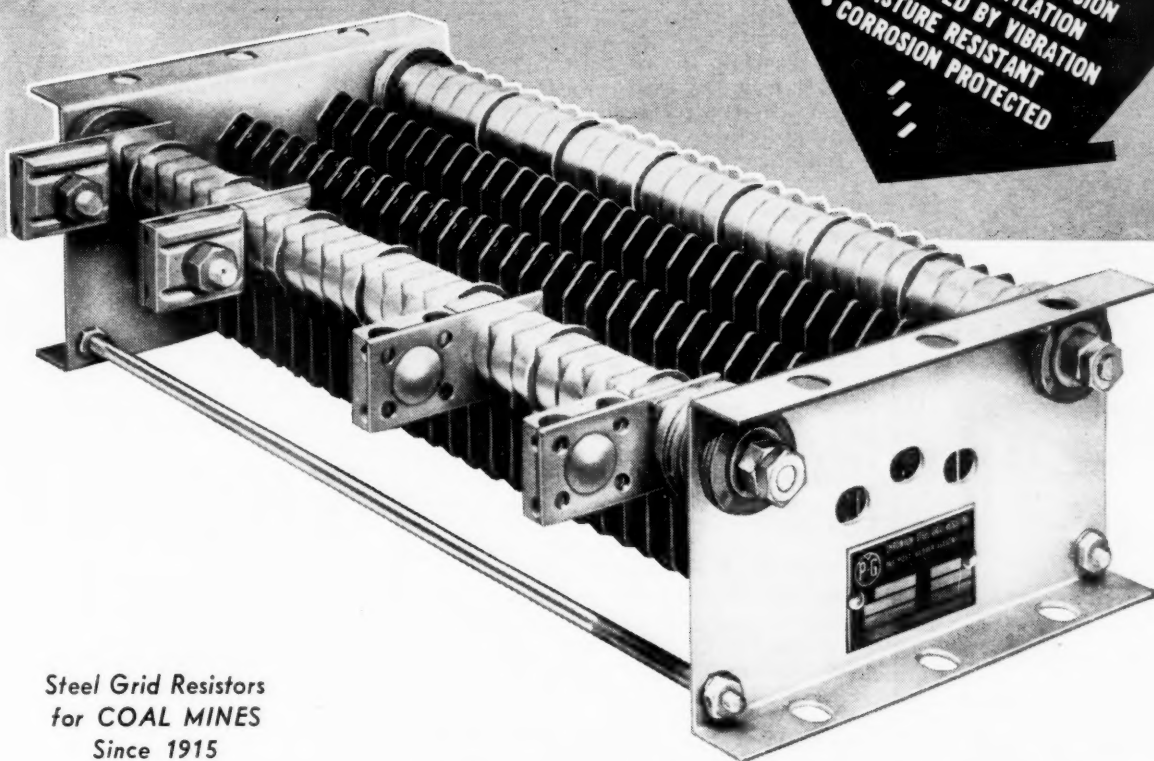
500 amp., $\frac{3}{8}$ -in. electrode. The semi-insulated models are No. B-14, 300 amp., $\frac{1}{4}$ -in. electrode; and No. B-38, 500 amp., $\frac{3}{8}$ -in. electrode. While a conventional tong-type holder, Twecotong features, according to the manufacturer, almost indestructible molded-laminated glass-cloth bakelite insulation keyed to the holder casting. The tensioning spring firmly seats on fiber upset washers and is protected from spatter by non-binding neoprene tubing. A well-ventilated fiber handle, together with good cable connection, assures a cool-running holder, it is said. Full information is included in the 1946 Twecolog available from the manufacturer.

Metallic Tires

Metallic rubber tires designed for heavy-duty service in such fields as strip mining of coal and ore and logging are expected to be generally available shortly according to the Goodyear Tire & Rubber Co. In appearance, says the company, these tires closely resemble those of the conventional

WHERE THE GOING IS TOUGHEST
use P-G Nonbreakable
Steel Grid Resistors

- ALL STEEL CONSTRUCTION
- MICA INSULATION
- RUGGED TERMINALS
- PROVISION FOR EXPANSION
- ADEQUATE VENTILATION
- UNAFFECTED BY VIBRATION
- MOISTURE RESISTANT
- CORROSION PROTECTED



Steel Grid Resistors
 for COAL MINES
 Since 1915

POST-GLOVER Steel Grid Resistors use steel and mica as basic materials to create continuous trouble-free resistor service. These materials and the unique P-G features of design provide a resistor capable of meeting the toughest of operating conditions. Neither vibration, moisture nor corrosive atmospheres have material effect on quality of service. Always specify P-G



The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

The **"C·M·I"** CONTINUOUS CENTRIFUGAL

is being used in the most modern cleaning plants for dewatering the minus $\frac{1}{4}$ " or $\frac{3}{8}$ " sizes or reclaiming the minus 10 mesh.



Whatever the feed size is, the product from the "C-M-I" contains less surface moisture than that obtained from any other type of mechanical dewatering and at a cost of only a few cents per ton.

**CENTRIFUGAL AND
MECHANICAL
INDUSTRIES**
INC.

3600 SOUTH SECOND STREET
ST. LOUIS 18, MO.

type. Yet fine metal wire of high tensile strength is firmly bonded with rubber to provide the foundation for this unusual tire.

Tests of Goodyear's wire tires during the war revealed their superiority in resistance to bruise, showed they were less susceptible to cutting, and indicated greater strength, the manufacturer reports. Construction of the wire tire consists of integrating a layer of thin strong tensile wire between two laminations of rubber.

Tool Holder

A new line of drop-forged lathe-turning and cut-off tool holders, embodying a patented feature for holding the cutting bit rigidly in place, is announced by the Cooper-Bessemer Corp., Industrial Tool Division, Mt. Vernon, Ohio. According to the manufacturer, the new turning tool holders are forged from a special-analysis steel known for its toughness, strength and maximum resistance to wear. The patented feature is a clamping pin that engages the bit for nearly its entire length. It contains two flush-type set screws which lock the tool bit into position with a vise-like grip, preventing any possible slippage.

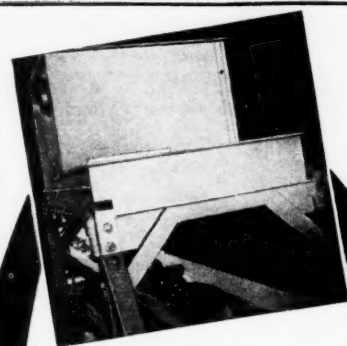
Industrial Notes

JOHN A. ROEBLING'S SONS CO., Trenton, N. J., has appointed as vice president in charge of engineering Ferdinand W. Roebbling 3rd, succeeding Charles M. Jones, who has become vice president in charge of public and industrial relations. Mr. Roebbling recently returned to the company after serving with the U. S. Army Engineers for five years.

M McNALLY-PITTSBURG MFG. CORP., Pittsburgh, Kan., has announced the purchase of a majority interest in the Morrow Mfg. Co., Wellston, Ohio, effective May 1. The Morrow company will continue to operate under its own name as a division of the McNally-Pittsburg Mfg. Corp., Frank C. Morrow continuing as president and Ford R. Morrow as vice president and general manager. Of the parent company officers who will maintain headquarters at Pittsburg, Kan., Edward McNally becomes chairman of the board; Homer W. Riley, senior vice president; and A. L. Tanner, secretary-treasurer, Morrow's present headquarters and sales office at Wellston, Ohio, will be augmented by the parent company's sales offices in Pittsburgh, Pa., and Chicago.

STEWART-WARNER CORP. has appointed Charles I. Kraus, formerly in charge of the industrial sales division, sales manager of the Alemite distribution division, and has named Gustave Treffeisen assistant sales manager of the division.

ACME PROTECTION EQUIPMENT CO., Pittsburgh, Pa., has announced the sale of its interests in the Acme Gas Mask to a partnership headed by G. M. Glidden, formerly district manager, E. D. Bullard Co., who will supervise production and sales as general manager. Operation of the gas-mask division will be transferred from Pittsburgh



MERRICK WEIGHTOMETER

While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER keeps a continuous and accurate record of weights. Total weight is available at a glance.

Applied to any size belt conveyor, either horizontal or inclined. The weightometer gives a simplified and dependable record of your production, without interrupting the flow of coal.

Write for Bulletin 375

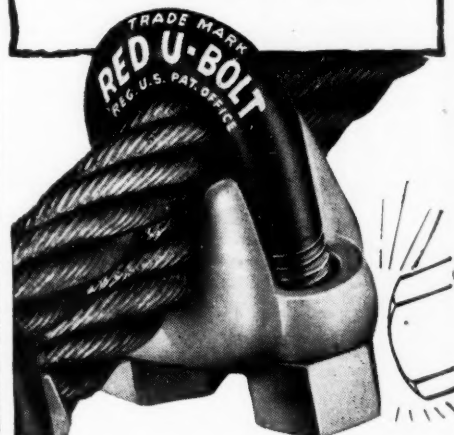
**MERRICK
SCALE
MFG. CO.**
PASSAIC,
N. J.

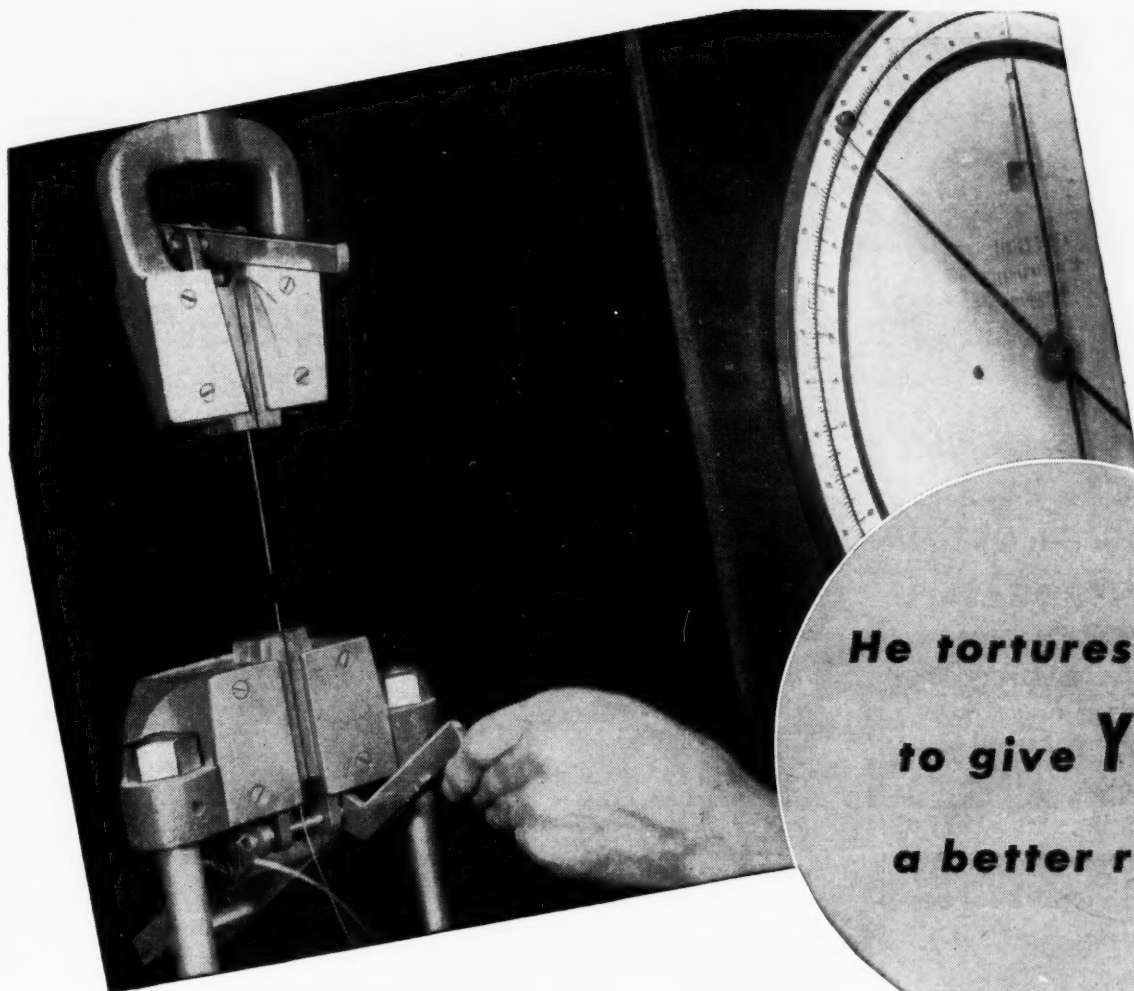
SHOCK- proof!

Sharpest blows will not break the forged steel bases of Crosby Clips. A product of American Hoist & Derrick Co., St. Paul. Distributors everywhere.

CROSBY CLIPS

Galvanized Drop Forged Steel





**He tortures wire
to give YOU
a better rope**

This Macwhyte laboratory technician is working in *your* interest. He gives the strength test to samples from each end of every coil of wire we make. Each sample is stretched to the breaking point. If it passes the test, the coil is tagged OK and used for Macwhyte Wire Rope. If not up to standard, the wire is rejected.

To make sure Macwhyte Rope will give

you maximum service, the finished wire is also given a torsion or twist test to check its stamina. Granular structure is analyzed by a microscopic camera. Wire samples are rotated in an arc by a special machine that checks their ability to withstand fatigue.

Strict metallurgical control is another reason you can always depend on Macwhyte Wire Rope for long, economical life.

Make MACWHYTE your headquarters for WIRE ROPE and SLINGS

MACWHYTE COMPANY

Wire Rope Manufacturers

2931 Fourteenth Avenue, Kenosha, Wisconsin

**Mill Depots: New York · Pittsburgh · Chicago · Minneapolis · Fort Worth
Portland · Seattle · San Francisco · Los Angeles**

Distributors throughout the U. S. A. and other countries

★ ★ ★ ★

MACWHYTE PREformed and Non-PREformed Wire Ropes—

**Internally Lubricated . . . MONARCH WHYTE STRAND
Wire Rope . . . Special Traction Elevator Rope . . .**

**Braided Wire Rope Slings . . . Aircraft Cables,
Assemblies and Tie-Rods . . . Stainless Steel Wire Rope,
Monel Metal Wire Rope, Galvanized Wire Rope.**



**Macwhyte Wire
Rope Catalog, G-15.
170 pages. Lists
Macwhyte's full
line, gives complete
manufacturing
story. Ask any Mac-
whyte representa-
tive or write Mac-
whyte Company.**

TAKE YOUR CHOICE

from the **2** types of
DUFF-NORTON
MINE ROOF **JACKS**



STANDARD

DUFF-NORTON
MINE ROOF JACK

Strong, safe, quick operating; made in two capacities—8 and 16 tons; heights from 30 to 72 inches, with a raise of 17 inches. Available with variety of head and handle styles.

TAILOR-MADE

DUFF-NORTON
MINE ROOF
JACK FITTINGS

You buy only the base and screw fittings, cutting your own 2 inch pipe to the height you need. Fittings are quickly and easily attached to pipe columns. Can be used over and over. Two capacities—8 and 16 tons.

Write for bulletins on both types of Duff-Norton Mine Roof Jacks.

THE DUFF-NORTON
MANUFACTURING CO.
PITTSBURGH, PA.

Canadian Plant: COATICOOK, QUE. There is a Distributor Near You

to new quarters at 3035 West Lake St., Chicago.

CATERPILLAR TRACTOR CO., Peoria, Ill., has announced the retirement of Carl O. Wold, a vice president of the company and executive head of the Russel Grader Mfg. Co. prior to its acquisition by Caterpillar in 1928. Mr. Wold retires after 40 years of service in the heavy construction machinery industry.

GENERAL DETROIT CORP. AND GENERAL PACIFIC CORP. have opened a new Cleveland office at 912 Park Bldg. and have placed Scott E. Collins, zone sales manager, in charge.

ELECTRIC STORAGE BATTERY CO., Philadelphia, Pa. has been awarded the "Certificate for Distinguished Service to Naval Ordnance Development" for its part in developing the battery that powered the electric torpedo, the silent tin fish that sank 1,856,200 tons of Jap shipping, including a 42,500-ton battleship. The citation was given by Rear Admiral G. F. Hussey Jr., chief of the Bureau of Ordnance, and was received by R. C. Norberg, president, the Electric Storage Battery Co.

HEWITT RUBBER CORP., Buffalo, N. Y., has changed its name to HEWITT-ROBINS INC., thereby bringing in the identity of its wholly owned subsidiary, Robins Conveyors Inc., it was announced by Thomas Robins Jr., president. Harold H. Von Thaden, 1st vice president of Robins Conveyors, has been elected a director of Hewitt-Robins Inc.

AMERICAN CAR & FOUNDRY CO., New York, has appointed J. W. Sheffer, with the company since 1908, general improvement engineer in direct charge of the improvement division with headquarters in New York. E. A. Watson has been appointed assistant general improvement engineer and H. F. Schwarting has been named general electrical engineer, with headquarters at St. Louis. E. B. Carpenter has been appointed district sales manager of the St. Louis office, succeeding L. W. Martin, retired.

GAR-WOOD INDUSTRIES INC., Detroit, has elected as president Charles W. Perelle, formerly vice president in charge of manufacturing of Consolidated-Vultee Aircraft Corp., who succeeds Glen A. Bassett, retired.

IRON & STEEL PRODUCTS, INC., Hedewisch Station, Chicago 33, Ill., has appointed Charles A. Marshall general manager. George L. Bladholm, recently released from the army as a captain, has been named special representative with headquarters in the Chicago office.

B. F. GOODRICH CO., Akron, Ohio has named W. F. Billingsley manager of tire construction.

LEHIGH SAFETY SHOE CO., Allentown, Pa., has announced that C. M. Mense, president of the firm since 1931, has retired as of June 1 but is continuing in an advisory capacity with the company. Frank B. Griswold, formerly merchandise and sales manager, succeeds Mr. Mense as president.

COAL OPERATORS CASUALTY CO. has announced removal of its home office from Pittsburgh to Greensburg, Pa., to provide

FOR SAFETY'S SAKE,
SUPERIOR COUPLINGS



Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL
COUPLINGS



PITTSBURGH
KNIFE & FORGE CO.

1421 Reedsdale St., N.S.
Pittsburgh 12, Pa.

QUALITY



PACKING

METALLIC & SEMI-METALLIC

PACKING

for

MINE PUMPS

"The Packing that gets the Repeat Orders"

For deep mine pumps. Resist acid mine waters. Keeps grit out of stuffing box. Three types.

• **MARLO ALL PURPOSE**
METALLIC PACKING

Best ever devised. Will not freeze at 70° below, soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• **"TWIN-TWIST"**
SEMI-METALLIC PACKING

Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressibility. Never hardens. For temperature up to 500° F.

• **"RED WATER"**
SEMI-METALLIC PACKING

Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

Let us serve you

THE MARLO COMPANY

38 HOWARD ST.
NEW YORK, N. Y., U. S. A.

I-T-E Automatic Reclosing Circuit Breakers MINIMIZE D-C POWER INTERRUPTIONS



1 HOUSING—Large doors are hinged at rear of mounting panel, giving plenty of room for inspecting breaker when they are opened wide. Housing is weatherproof.

2 BASE—Heavy fabricated base forms a solid support and the circuit breaker may be simply set on the ground. Runners permit moving breaker when this becomes necessary. Straps allow pole mounting if desired.

3 CABLE CONNECTIONS—Incoming and outgoing cables are located on each side at the rear. Connection bars slope downward from breaker and bushings are weatherproof. Solderless cable connectors are provided to speed installation.

4 RESISTOR—Bridging resistor is part of load measuring relay circuit that detects whether a fault exists and when breaker may be reclosed automatically. Screen housing provides full protection and ventilation.

5 HOOD—Hood protects circuit interrupting parts but is quickly removed for inspecting arc chute and contacts. Contacts are also readily removable using ordinary tools.

6 WIRING DIAGRAM—Wiring diagram is conveniently located in a holder with transparent plastic cover inside door. Always clean but ready for immediate use.

7 RELAYS—Relay equipment including load measuring and automatic reclosing control is provided to suit each installation.

Boost your mine operating profits by reducing the prolonged electrical interruptions that are so wasteful in lost man hours and idle machines. These I-T-E Automatic Reclosing Circuit Breakers, applied to sectionalized tie lines as independent, stub end feeder, tie-feeder or multiple fed circuit breakers, cut out only the section in which trouble occurs and allow others to continue full operation. After the breaker has opened, a load measuring relay continuously "feels" the circuit and when the overload or

short circuit conditions have been corrected, the breaker recloses automatically. Full power is restored without needless delay.

Ask your nearest I-T-E representative or write to the I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pa. for illustrated Bulletin 2503 which describes in detail the I-T-E Automatic Reclosing Circuit Breaker and its applications.

Representatives in All Principal Cities.

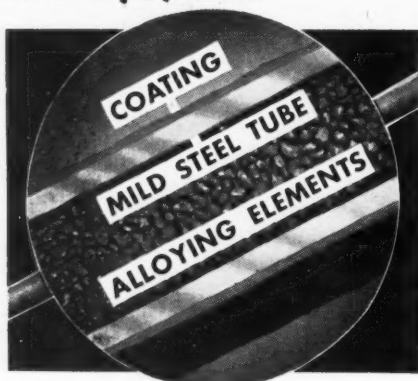


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...for Building Up and Welding to Manganese Steel Equipment



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Because COATED STOODY MANGANESE alloying elements are tightly rolled in mild steel tubes, there are no manufacturing limitations restricting the percentage of manganese included. You get an abundance of manganese, allowing for burn-out loss with ample margin of safety to assure maximum toughness and wear resistance of deposits. All risk of brittle deposits due to insufficient manganese is eliminated!

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FOR MAXIMUM WEAR RESISTANCE on any part receiving impact and abrasion always hard-face with STOODY SELF-HARDENING... Doubles the life of manganese steel equipment!

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STOODY HARD-FACING ALLOYS

Refers Wear Save Repair

space necessary for expanding operation.

LE ROE Co. is establishing a new Cleveland manufacturing division for the production of rock drills and related pneumatic equipment for the construction, mining and transportation industries and has placed Russel R. Morgan, formerly with the Cleveland Rock Drill Co., in charge of the new plant.

MINES EQUIPMENT Co., St. Louis, Mo., recently appointed Paul M. Barlow sales engineer for its territory comprising West Virginia, the bordering counties of Kentucky and Ohio, and the western half of Pennsylvania. Mr. Barlow is well known among operators in the West Virginia area, having served since 1935 as an electrical engineer with the West Virginia Engineering Co., the West Virginia Department of Mines and the Carbide & Carbon Chemical Co.

AJAX FLEXIBLE COUPLING Co., Inc., Westfield, N. Y., has announced the purchase of an 11-acre site and plans for the immediate erection of a new factory for increasing production of Ajax vibrating conveyors and screens.

Trade Literature

DIESEL-NOZZLE TESTER—Buda Co., Harvey, Ill. Bulletin No. 1238 describes the Buda Universal diesel-nozzle tester, a low-cost portable tool that will test all makes and models of diesel nozzles and injectors.

PLASTIC REFLECTORS—Plastics Division, General Electric Co., Pittsfield, Mass. Booklet entitled "Plastics For Light Conditioning" describes the uses of plastics for reflectors and shades and lists all models now available with the characteristics of each type.

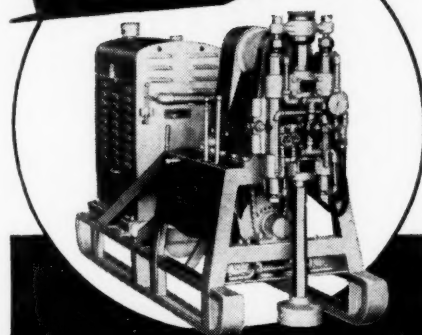
HIGH-TENSILE STEEL—Jones & Laughlin Steel Corp., 311 Ross St., Pittsburgh 30, Pa. Booklet provides technical information, suggested applications and specifications for Otiscoloy, a high-tensile, low-alloy steel manufactured by J & L to meet the need for a readily weldable and easily fabricated, corrosion-resistant steel of substantially greater strength than the standard carbon structural steels.

GRADER—Caterpillar Tractor Co., Peoria 8, Ill. Folder 9354 contains a description and illustrations of the construction and production attributes of the Caterpillar diesel No. 12 motor grader. Features explained include long life and economical operation, the 75-hp Caterpillar diesel engine, heavy-duty six-speed transmission and trouble-free mechanical power controls.

ELECTRIC TOOLS—Syntron Co., Homer City, Pa. Catalogue 464 illustrates and describes the complete line of Syntron electric tool equipment, including portable electric hammers, drills, screwdrivers, nut runners, grinders, sanders and semi-portable hack saws for use in construction and maintenance.

INSULATED WIRE AND CABLE—Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass. Data sheet No. 114 illustrates and describes Simplex-Plastex insul-

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Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

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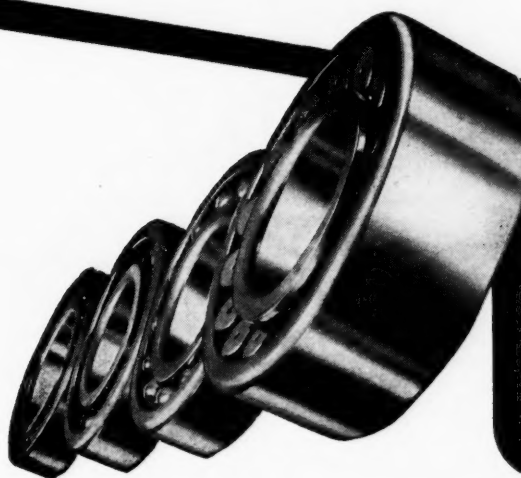
moved Uphill by an **SKF**-equipped drive unit!

Drawing coal uphill is a tough job, but this Vulcan Shaking-Conveyor Drive Unit takes it in its stride. So does the **SKF** Bearing on the connecting-rod crankshaft, from which the reciprocating motion on this machine is derived for the chute. Despite severe service conditions, this **SKF** performs smoothly at all speeds, insuring continuous performance. It re-

quires no adjustments, and its needs are reduced to infrequent lubrication. In this **SKF**—as in **SKF** Bearings on drills, cutters, loaders, locomotives, fans, pumps, motors, crushers, screens, hoists and other mining equipment—performance is the thing that counts.

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in the
RIGHT PLACE

ated wire and cable and contains an engineering table which gives the physical and electrical properties of Plastex under varying conditions of temperature.

CRANES—Orton Crane & Shovel Co., 608 South Dearborn St., Chicago 5, Ill. Catalog No. 73 describes one-man Aero cranes for plant-yard uses. Tables give general dimensions of all seven models and their normal working capacities at an operating radius of 9 to 50 ft. and the weights of rehandling and excavating-clamshell buckets loaded with various kinds of loose materials.

BULLDOZERS—Caterpillar Tractor Co., Peoria 8, Ill. Folder 9356 illustrates the capabilities of the new Caterpillar No. 8A and No. 7A (angling-type) bulldozers. The bulldozers, new additions to the Caterpillar line, designed and built for exclusive use with Caterpillar diesel D8 and D7 tractors, are pictured in actual operations.

MOLDED INSULATION—General Electric Co., Pittsfield, Mass. Booklet describes G-E Mycalex, a stone-like product composed of mica and a special glass said to be used where stability at high-operating tempera-

tures and widely changing atmospheric conditions, together with inherently high-arc resistance, high electrical and mechanical strength and low-dielectric power loss, are primary considerations. The properties, available types, molded parts, fabricated parts, machining practice and other design details are listed, together with how and where to order the material. The various features of the material are compared with the same properties of cold-molded refractory materials, hot-molded phenolics, wet-process porcelain, steatite and fused quartz.

BELTING—Hewitt Robins Inc., Buffalo, N. Y. Catalog includes specifications on the company's wide line of conveyor, transmission and elevator belting sold under the brand names of Monarch, Ajax and Conservo. Maintenance suggestions advise users how to prolong life of belts and avoid costly production delays. Many belt uses are illustrated by plant photographs and belt construction is shown by sectional drawings.

FLAME GUN—Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y. Catalog No. 2028 describes and illustrates the company's complete line of flame guns for destroying weeds.

GOGGLE-CLEANING CABINET—Mine Safety Appliances Co., Thomas & Meade Sts., Pittsburgh, Pa. Bulletin No. CE-28 features the M.S.A. goggle-cleaning cabinet for mounting in shops, near mine workings, in locker rooms, etc. Fogproof for cleaning lenses and preventing their fogging also is described.

LARGE-CAPACITY PUMPS—Economy Pumps, Inc., Hamilton, Ohio, Catalog No. G-845 displays the company's axial flow pumps for capacities up to 100,000 g.p.m. and heads up to 50 ft. Propeller- and mixed-flow impeller-type pumps are thoroughly illustrated with photographs and cross-section drawings and various applications are shown.

AUTOMOTIVE DIFFERENTIALS—Thornton Tandem Co., 8701-79 Grinnell Ave., Detroit 13, Mich. Operation and maintenance manual for the Thornton automatic-locking differential contains complete operating details, installation instructions, maintenance and lubrication information and a parts list. Construction details are explained and illustrated.

SHORTWALL COAL CUTTERS—Goodman Mfg. Co., Halstead at 48th St., Chicago 9, Ill. Bulletin No. CM-453 depicts the company's line of shortwall cutters for various types of operations. Construction details are explained and the machines are illustrated on actual jobs.

WATER-CLEANING SYSTEMS—Gale Oil Separator Co., Inc., 52 Vanderbilt Ave. New York 17, N. Y. Folder illustrates and describes equipment available for the removal of oil, grease and waste acid liquids from industrial water which, after treatment, can be used again.

DUST COLLECTOR—Ideal Industries, Inc., Sycamore, Ill. Folder outlines the construction and applications of the Ideal dust collector for removing dust and other foreign particles created in the operation of lathes, grinders and various other machines.

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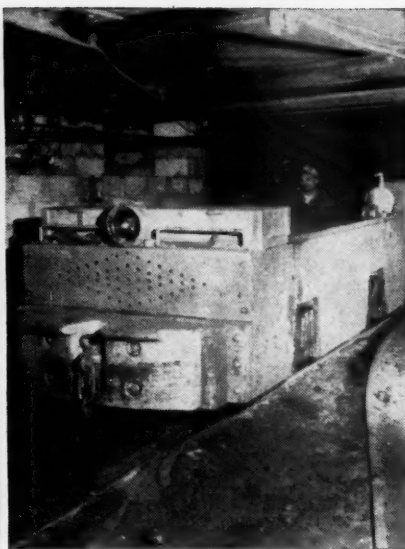
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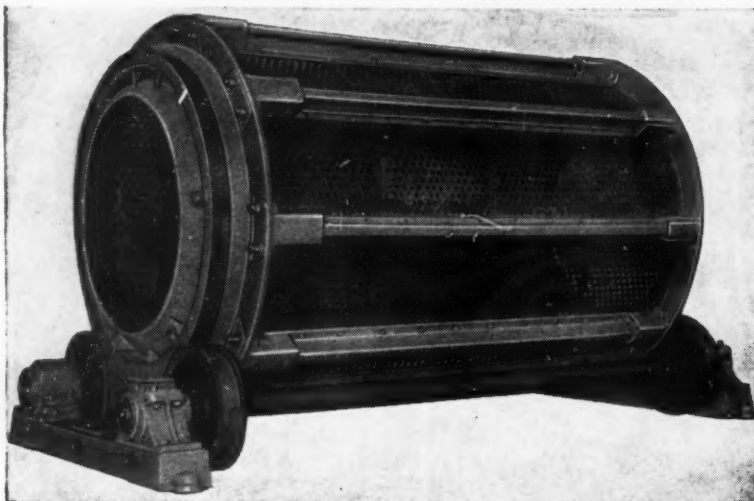
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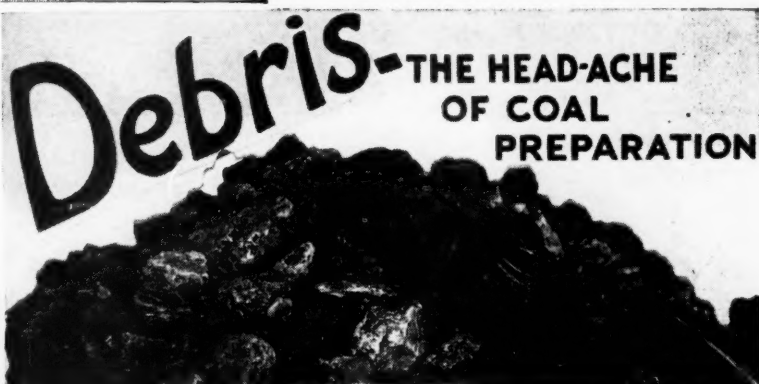
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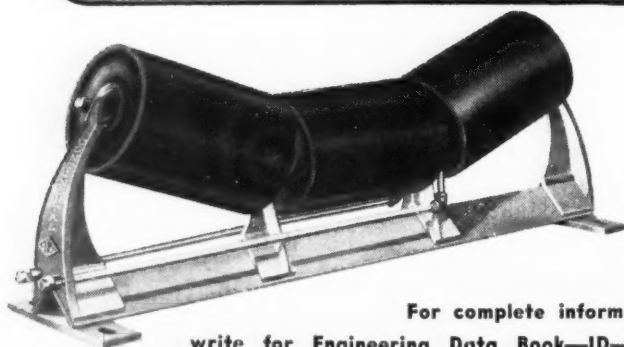
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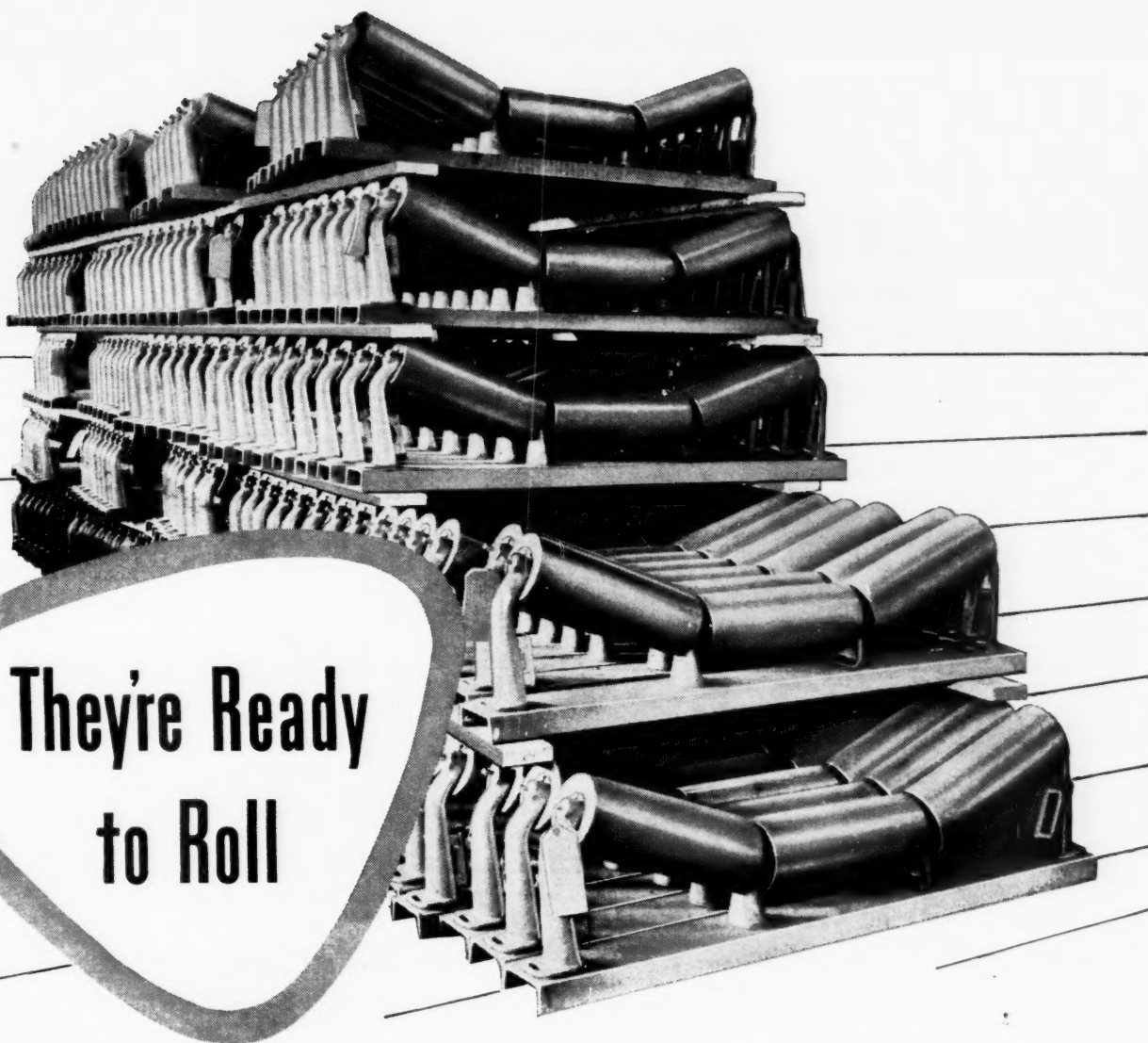


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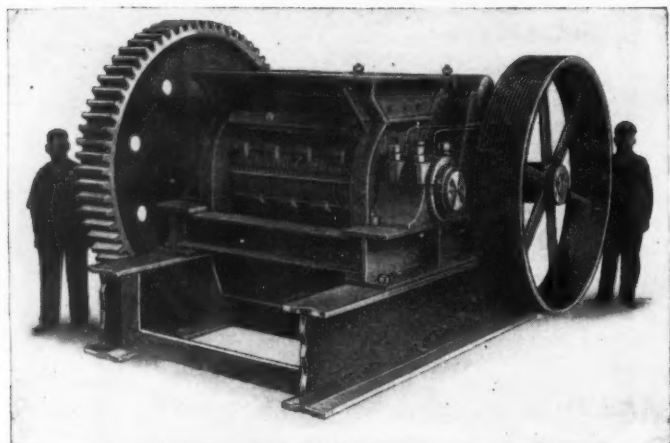
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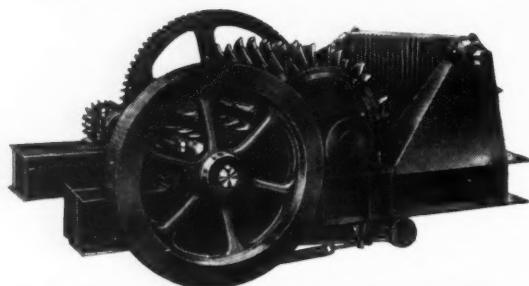
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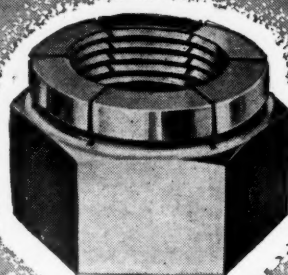
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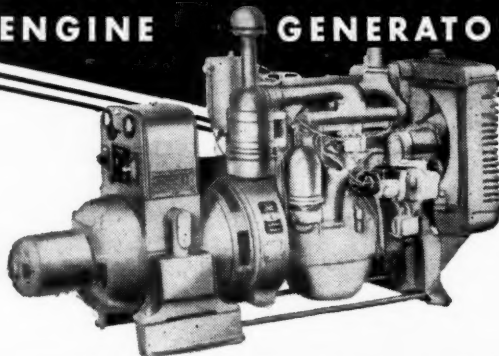
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Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

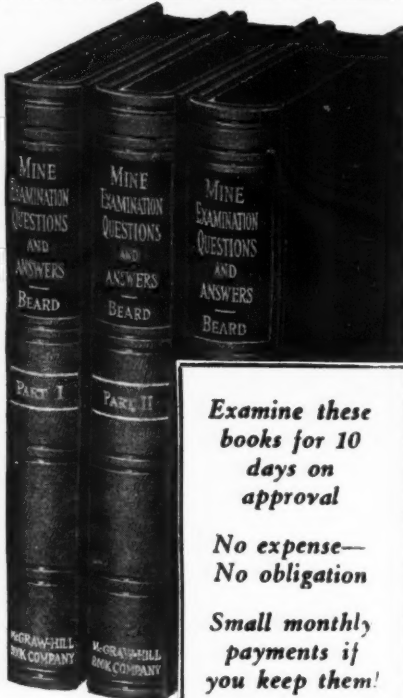
Name five duties imposed on mine foremen by law?

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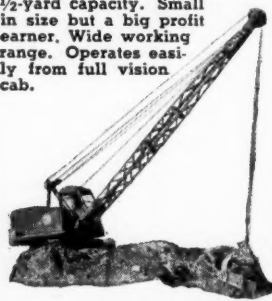
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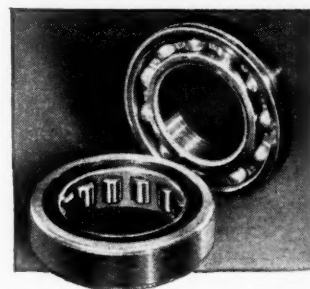
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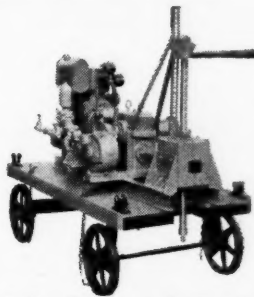
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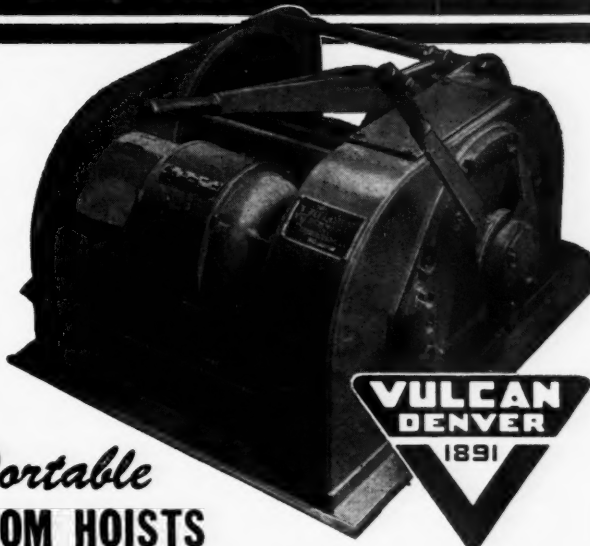
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 1—30 KW 250 v. DC cp. wd. Gen. dir. con. 220/440 v. 3 ph. 60 cy. AC Motor.
 1—30 KW 250 v. DC 1200 rpm. G.E. Gen. dir. con. to 2200/440/220 v. 3/400 syn. motor.
 1—20 KW 1150 rpm. 250 v. Westg. Gen. dir. driven by 30 HP 1150 rpm. motor.

MINE LOCOMOTIVES
 1—5 ton Ironton Storage Battery Locomotive.

PUMPS
 1—Amer. Piston Pump—5½"x4½"—size 8x12.
 1—48 GPM 161' hd. Roper 3" suc. 3" dis.
 1—220 GPM 225 ft. head, 600 rpm. 2x2" Blackmer.
 1—220 GPM 225 ft. head, 600 rpm. 3½"x3" Blackmer.
 2—500 GPM Morris Machine Wks. 4" suc. 4" dis. 123" hd. 1760 rpm.
 1—2000 GPM DeLaval 170' head.
 1—3000 GPM DeLaval 144' hd. 150 HP.
 1—3500 GPM DeLaval 130' hd. 1450 rpm.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
400	Westg.	CW	2200	435
350	Westg.	CW	2200	900
50-60	Westg.	CW	220	1800
50	Chand.		220/440	1800
5	Duquesne		220/440	1200
40-50	Westg.	CW	220/440	1200
50	Triumph		220	1150

230 V. DC MOTORS

HP	Make	RPM	Type
150	Westg.	1150	SK
85	Westg.	500	M
80	Westg.	490	76A
50	Westg.	250, 750	SK
25	Westg.	600	SK
25	G.E.	650	MD
20	Westg.	600	M
20	Westg.	1750	SK
20	Westg.	975	S
20	Westg.	1750	SK
15	Al. Ch.	800	SK
13½	Al. Ch.	700	CM
13	Cr. Wh.	1100	33M
10	Cr. Wh.	675	CM
10	Cr. Wh.	825	RC-11
8	G.E.	950	
7.5	Electro Dynamic	1750	M
7	Westg.	750	
5	Robbins Myers	3400	
5	Westg.	850	CM
5	Cr. Wh.	980	

ALTERNATING CURRENT MOTORS
 3 ph. 60 cy.

HP	Make	Volts	RPM	Type
225	Westg.	220/440	1200	C
200	Westg.	220/440	1200	C
150	Westg.	220/440	900	C
150	Wagner	440	1800	31V
125	Allis Chal.	200 or 440	1800	AN

100	Allis Chal.	220 or 440	1800	AN
100	Westg.	220/440	860	CCL
75	Triumph	220	685	B15
75	Allis Chal.	220 or 440	1200	AN
75	G.E.	2300	1760	
75	G.E.	2200	1755	
60	Westg.	220-440	1800	
50	Westg.	220	1200	CD
50	Chandeysson	220/440	1800	
50	Westg.	220	1200	
30	Westg.	220/440	680	CS
30	West. Elec.	440	1200-1800	
25	Westg.	440	575	CS
20	Westg.	220/440	515	CS

MAGNETIC STARTERS
 40—NEW, 5, 7½, 10 and 15 HP 230 v. DC Cutler Hammer drip proof Magnetic Starters.

TRANSFORMERS
 1 2 1040/2080 52/104 G.E.
 1 10 2300/1150 220/110 Westg.
 1—75 KVA Scott Connected Pittsburgh Transformer, 220 v. two to three phase or three to two phase.

COMPRESSORS
 2—315 CFM Ingersoll Rand portable 100# pres. driven by 105 HP Waukesha Oil Engines, 860 rpm.
 1—150 cu. ft. 100# pressure National Brake & Electric Compressor direct driven by 30 HP 220 or 440 v. 380 motor with control.

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 1—50 kw. 250 v. DC Gen. dir. conn. to 65 HP Primma Diesel Hor. Engine.

MINE FANS
 6—15,000 cu. ft. Clarage Fans 10 HP motors.

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As is or repaired per I.C.C. specifications with class 1, 2, or 3 repair job.

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- 7 Class L Switch Locomotives
- 2 Class X Freight Locomotives
- 5 Class V Freight Locomotives
- 1 Class U Passenger Locomotive

2-8-0, Weight 215500 lbs.
 Tractive power 43100 lbs.
 0-6-0, Weight 161100 lbs.
 Tractive power 34400 lbs.
 2-10-2, Weight 352500 lbs.
 Tractive power 71100 lbs.
 2-6-0, Weight 178800 lbs.
 Tractive power 31700 lbs.
 2-6-0, Weight 162800 lbs.
 Tractive power 28900 lbs.

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- 44 Composite Gondola Cars
- 12 Underframe Flat Cars

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- 1—Wellman, Keyed Drum, 60" Dia. will coil 4500 ft. 1" rope, 200 or 300 H. P. Motor with Magnetic Control.
- 1—Vulcan, Shaft Hoist, 72" Dia. Suitable 300 ft. Shaft. Motor with control to suit requirements.
- 1—Nordberg, Shaft Hoist, 72" Dia. Suitable 200 ft. Shaft. 150 H.P. Motor with Control.
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CE 7 Sullivan 250 v. 6' bar, any gauge.
12DA Goodman 250 v. 6' bar, shortwall.
3-35 L Jeffrey Low Vein 6' AC Shortwall.

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3-6 Ton G.E., permissible 36/44" Ga. HM 825 BB Motors. 2 with Edison Batteries.
Haulage & Gathering Locomotives.
1-5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas 2 BB Motors.

Haulage & Gathering Locomotives

13 Ton Westgh. 250 c. 36" or 40" Ga.
13 Ton Westgh. Bar Steel 500 v. 40/42".
2-13 Ton G.E. 5" armorplate 500 v. 44" Ga.
10 Ton Jeffrey MH 110, 250 v. 36/42" Ga.

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18 x 24 and 18 x 30 New Scottsdale dbl. roll.

AIR COMPRESSORS

1300 cu. ft. 100# Pres. Worthington 2 stage Belted.
9" x 8" Sullivan Portable—motor driven.

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500 HP Morse ratio 4.28 to 1.
250 HP Ottumwa ratio 12.7 to 1.
2-40 HP Ohio Forge ratio 45 to 1.

Rotary Con. & MG Sets (3 ph. 60 cy.)

500 KW West. Rotary Converter 275 v. 6 phase 1200 RPM with transformers and switchboard.
300 KW G.E. HC 12 Rotary 275 v. 6 ph.
150 KW Ridgway 275 v. 900 RPM dir. con. 225 HP.
125 KW G.E. 250 v.—190 HP G.E. I-K 440/220 v.
75 KW West. Elec. 250 v.—2200 v. 900 RPM.
50 KW G.E. 125 v.—75 HP West. 220/440.
35 KW G.E. 250 v.—50 HP G.E. 220/440 v.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
500	Elec. Mfg.	900		Syn.
500	G.E.	450	S.R.	MT 412
350	Al. Ch.	720	S.R.	I-M
350	G.E.	900	S.R.	CW
300	West.	1750	S.R.	MT 412
200	G.E.	240	S.R.	I-M
200	G.E.	600	S.R.	Syn.
150	West.	1750	S.R.	CW
100	G.E.	500	S.R.	M 1-25 cy.
100	L.A.	1200	S.C.	OX 113Z
100	G.E.	720	S.C.	I-K
75	G.E.	720	S.C.	I K
60 (4)	G.E.	514	S.C.	K
50 (2)	G.E.	600	S.R.	HI
40 (3)	G.E.	600	S.R.	MT
30	G.E.	900	S.R.	MTC
20 (2)	G.E.	720	S.C.	K
20	West.	1800	S.C.	CS 364

MINE CARS

30-2 Ton Cars Roller brgs. low type, 42" Ga.

DC Motors and Generators 230/250 V.

HP	Make	Speed	WDG	Type
175	G.E.	475	ser.	MD 109
150KW	Cr. Wb.	550	ep.	CO 1812
130	G.E.	550	ser.	MD 108
100	G.E.	480	ser.	S
100	West.	625	ep.	S
75KW	West.	1000	ep.	185T
50	Reliance	1500		SK 80L
40	Roth	1500		SK
20	West.	750		CM
15	Cr. Wh.	800	sh.	S
15	West.	500	ep.	CC
7 1/2	G.E.	825		SK 284
3	New West. Vert.	1750	sh.	B 254
	New G.E.	1150	ep.	

HOISTS

Lidgerwood slope hoist Drum 42" dia. 36" wide 10" flanges with 200 HP G.E. slipring motor.
100 HP Shaft Hoist—West. S.R. Motor.
40 HP Lidgerwood sgl. fr. drum geared to 40 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev.
30 HP Carlin double dr. fr. 13" x 18"—5 1/4" flgs.
10 HP Hoist sgl. fr. dr. 22" Face 12" dia. 7" flgs.

PUMPS

100 GPM 325' Head F.M. 2" suc. 1 1/2" dia. dir. con.
15 HP F.M. 220/440 v. 3600 RPM Motor.
2-400 GPM 170' Head Lea Courtenay 4" suc. 4" Dis.
500 GPM 135' Head Janesville 4" suc. 3" dia.
700 GPM 160' Head DeLaval 6" suc. 6" dia.

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500 KW AL-CH SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

300 KW G.E., SYN. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Semi-Automatic Switchgear.
150 KW G.E. SYN. 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.
150 KW G.E. SYN. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.

LOCOMOTIVES

15-T Gen. Elec. 500/250 V., 820-A Mts., 36"-42" Ga.
13-T WESTGHSE., 500/250 V., 908-C Mts., 36"-44" Ga.
13-T GOODMAN, 500/250 V., 36-B Mts., 36"-42" Ga.
10-T JEFFREY, 250 V., 110 Mts., 36"-48" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHSE., 250 V., 906-C Mts., 36"-44" Ga.
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1-29-LE Jeffrey Coal Cutter, 250 Volts DC, mounted on Joy Cats
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1-5 KVA West. 440/220/110 Volts
1-3 KVA Gen. Elec. 550-110/220 Volts
1-3 KVA Western Elec. 1100/2200-220/440 Volts

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1-25 H.P. Gen. Elec. Motor, 900 RPM
1-15 H.P. West. Motor, 900 RPM
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A. C. MOTORS

USED

AC & DC MOTORS

35 KWMG Set. Centrifugal Pumps

Agents

CUTLER HAMMER CONTROLS
ARMATURE & MOTOR REWINDING

UNITED ELECTRIC & MACHINE CO.

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Mercury Arc Rectifier, 833 amps., 500 Kw at 600 volts DC, or can be re-rated a lower capacity for lower DC voltage output (ie. 275 V DC); complete with 3/6 phase, 60 cycle transformer and automatic switchboards.

Very attractively priced for immediate sale

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ONE AMERICAN PULVERIZER

Type A. C. Serial No. 2258

Complete with V-Belt Sheave

Excellent condition - Immediate delivery

MIDWEST-RADIANT CORPORATION
220 North Fourth St., St. Louis, 2, Missouri

FOR IMMEDIATE DELIVERY OF RUBBER PRODUCTS

Conveyor Belting...Transmission
Belting...Elevator Belting...Fire,
Water, Air, Steam, Suction or
Welding Hose, etc.

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THE
RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE
NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes "D" WIDTH All Sizes
"B" WIDTH All Sizes "E" WIDTH All Sizes
"C" WIDTH All Sizes Sold in Matched Sets
Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER... HEAVY DUTY RUBBER HOSE

WATER HOSE Each Length with Couplings Attached

I.D. Size	Length	per Length
3/4"	25 feet	\$4.25
	50 "	8.00
1"	25 "	6.25
	50 "	12.00
1 1/4"	25 "	7.50
	35 "	10.50
	40 "	12.00
1 1/2"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE I.D. Size Length per Length Couplings

1/2"	25 feet	\$5.00	\$1.50 Pair
	50 "	10.00	1.50 "
3/4"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.

62-66 PARK PLACE

NEW YORK, N. Y.

For Immediate Delivery

- 1—880 KW NORDBERG UNAFLOW Engine Generator SET: Left hand, non-condensing, 3/60/440.
- 1—750 KW NORDBERG Corliss Engine Generator SET: non-condensing, 3/60/440.
- 1—27 Ton Standard Gauge, Baldwin Saddle Tank LOCOMOTIVE.
- 1—62 Ton American-Consolidation Standard Gauge LOCOMOTIVE, ICC.

Machine Shop, Blacksmith Shop,
Motors, Tools, Supplies, etc.

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NEWBERRY MANUFACTURING CO.
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RAILROAD CARS

(Standard Gauge)

Prompt Shipment

- 5—50-Ton, All-Steel Flat Bottom Gondola Cars. Multiple Wear Steel Wheels. "U" Section Cast Steel Side Frames.
- 76—50-Ton All-Steel Side Discharge Hopper Cars. Cast Steel Side Frames.

IRON & STEEL PRODUCTS, INC.

41 years' experience

13484 S. Brainard Ave.,
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"ANYTHING" containing IRON or STEEL"



SEARCHLIGHT SECTION



FOR SALE

HOISTS

1—Ottumwa Electric hoist, single rigid-cylinder-conical drum, with automatic control. Weight of cage 7000#, weight of car 2500#, weight of coal 6000#, lift 310', diameter of rope 1 1/4". Diameter of drum 60"x84". Brake, 84" diameter, 8" face, post type, oil operated. Drum shaft bearings 10"x20". Hoist is equipped with single reduction gears 19 and 229 teeth. 2 1/2 D.P. 11" face. The drum has five grooves on the 60" diameter, 11 grooves up the cone. 4 grooves on the 84" diameter. The drum has a rope capacity of 326 feet plus three dead turns. The hoist is equipped with a 200 HP motor.

1—Ottumwa Iron Works single drum hoist. Width of drum 28", height of flange 5", diameter of drum 39", teeth in pinion gear 16, teeth in drum gear 86. Connected by flexible coupling to Ottumwa Iron Works speed reducer, size SF-11. R-220 which in turn is connected by flexible coupling to a 60 HP General Electric slip ring motor model #93E200 G1 type MTC 5536, form BL. 220/440 volts, 3 phase, 60 cycle, 900 rpm, #5282160. Complete with reversible controller and resistance.

MINING MACHINES

3—Goodman Longwall mining machines, DC, 36" or 42" gauge.

6—Jeffrey 35A Shortwall mining machines, 50 HP motors, 250 volts, DC. 6' cutter bars, 36" or 42" gauge.

2—Sullivan CH-11 Shearing Machines, 250 volts, DC. 7 ft. cutter bars, 36" or 42" gauge.

1—Sullivan CH-11 Shearing machine, AC, 220 volts, 3 ph, 60 cy. 7 ft. cutter bars, 36" or 42" gauge.

1—Sullivan CE-7 Shortwall mining machine, AC, 220 volts, 3 ph, 60 cy. tip-turn truck, 7 ft. cutter bar, 36" or 42" gauge.

2—Sullivan Longwall mining machines, AC, #2991, #7061.

1—Sullivan CR3 Shortwall Cutting Machine 250 volts DC. Late style rope type machine complete with electric cable and reel.

2—Sullivan CLE5 Longwall mining machines, AC, 220 volts, 4 ft. cutter bars.

LOCOMOTIVES

3—Goodman 5 ton locomotives, type W1-2A5, 36" or 42" gauge. One is complete with electric reel.

2—Goodman 6 ton ball bearing locomotives, type 3314T, 36" or 42" gauge.

1—6 ton Goodman Locomotive, type 13314T, 250 volts, 41 1/2" gauge, ball bearing motors.

STEEL TIPPLES

1—Tippie and shaker constructed by Allen and Garcia Company. Capacity 3000 tons daily. Have new and second hand rails and track accessories.

COAL TREATMENT PLANT

1—Viking Hot Vapor Dust Control Unit. Capacity 75 tons per hour equipped with CP 200-20 pump. Has an oil tank of approximately 320 gallon capacity.

1—50 KW General Electric motor generator set, type RC15, form A, 250/275 volts, direct connected to 75 HP, General Electric, AC, motor, 440 volts, 1165 rpm.

We are distributors for John A. Roebling Sons Company wire rope and fittings.

GAVENDA BROTHERS

CANTON, ILLINOIS

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TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign all Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR
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THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI, OHIO

PIPE—MACHINERY—GAS ENGINES AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY
WAYNE, WOOD COUNTY, OHIO Near Toledo

PIPE New & Reconditioned
ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS
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NORRISTOWN, PA.

TOP CUTTING MACHINE

1—Goodman type 724 E J 250 volt, 9ft. Cutter Bar with two chains, adjustable from 35" to 77" cut.

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Large stocks, all sizes
attractive prices

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500-BBL. CAPACITY NEW API BOLTED STORAGE STEEL TANKS

17—High-Type Galvanized (12 gauge throughout) 15'4 1/2" I.D. x 16'1" high.
4—High-Type Black (12 gauge throughout) 15'4 1/2" I.D. x 16'1" high.
81—Low-Type (10 gauge Shell and Bottom (12 gauge deck) 21'6 3/4" I.D. x 8'0 1/2" high. Tanks unassembled complete with bolts, gaskets, fittings, erection tools and crated for shipment. Location: New York State. For further information: Wire—Phone—Write.

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Tel. Cortland 7-4676

1—3 yd. Walking Dragline with 76 ft. boom
MODEL 3T Monihan Electric, complete with transformers, cable and bucket. Excellent mechanical condition.

1—Page 220-2 yd. DIESEL DRAGLINE 95 ft. boom. RAIL, MACHINE IN GOOD CONDITION.

1—PRACTICALLY NEW HARDS COG horizontal drill using 5" bits.

1—8", 1-6" centrif. gasoline powered pumps.

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Following equipment
all located at Zap, North Dakota.
May be inspected at any time.

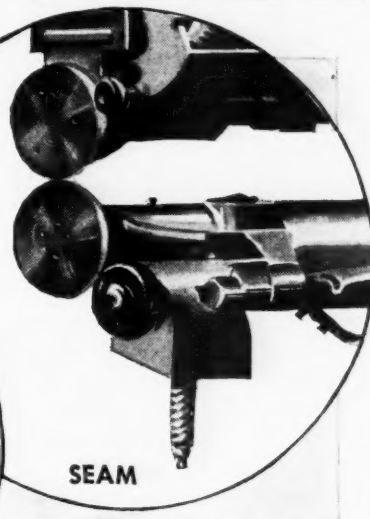
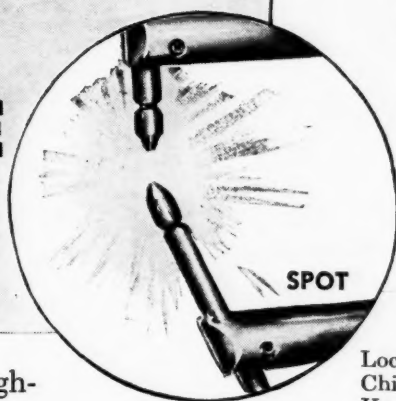
3—Vulcan steam locomotives, 18 ton, 42" gauge
2—Davenport steam locomotives, 21 ton, 42" gauge
1—Whitcomb gas locomotive, 14 ton, 42" gauge
10—18 ton roller bearing steel bottom dump hopper cars, 42" gauge
1—Bucyrus-Erie GA2 shovel 1 1/4 yard coal bucket
1—International TK40 gas caterpillar tractor
1—1 1/2 yard manganese tip ore shovel bucket
1—1 1/4 yard manganese tip ore shovel bucket
1—3 yard Daniels Murtaugh dragline rock bucket
1—Atlas Imperial 65 h.p. diesel engine
1—Fairbanks Morse 20 h.p. diesel engine
1—150 h.p. Bros steam boiler
1—Dryer, steam, 100 lbs. pressure, Capacity 20 tons material
Approximately 325 tons railroad steel, 45 to 90 lbs. Also large quantity angle bars, frogs, switch points, bolts, spikes, etc.

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DAKOTA COLLIERIES COMPANY
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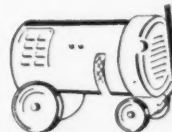
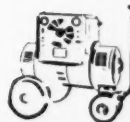
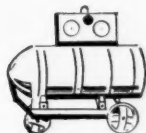
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AND FLASH WELDERS

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DC and AC Types; 300 to 400 amperes
DC available in large quantities.



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Many sizes and capacities including head and tailstock combinations.



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Both portable and stationary, single and multiple torch types.

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WAR ASSETS ADMINISTRATION

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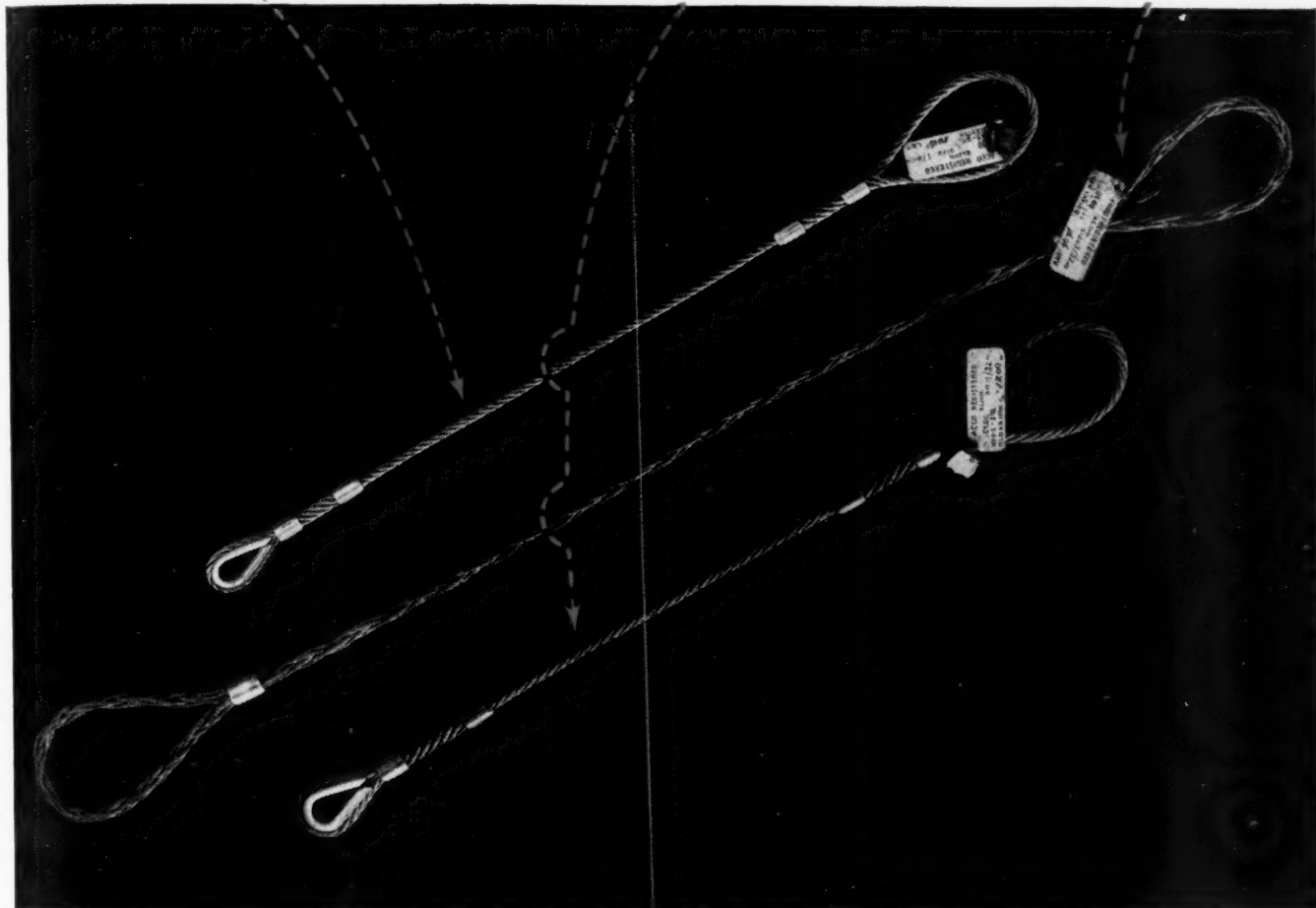
Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver
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Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia
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An asterisk preceding manufacturer's name indicates detailed information may be found in the 1945-1946 *MINING CATALOG*

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WHICH SLING?

Strand-Laid? Cable-Laid? Braided?



American Cable has a wider range of sling types than any other manufacturer. Here you can get the exact type of sling best suited to your job. Whether the conventional strand-laid sling, the cable-laid sling, or braided slings made up in 4, 6 and 8 parts, American Cable engineers hold no brief except for the one that will do your job best. And in wire rope endings, too, American Cable takes the lead with the new, 100% efficient ACCO-LOC Safety Splice and the swaged U-LOC. More than this, you may have your American Cable slings proof-tested and registered for known strength and safety. Here again is another sling service that is exclusive with American Chain & Cable. You cannot buy a better sling than an ACCO-Registered sling — made of TRU-LAY Preformed Wire Rope of Improved Plow Steel.



ACCO

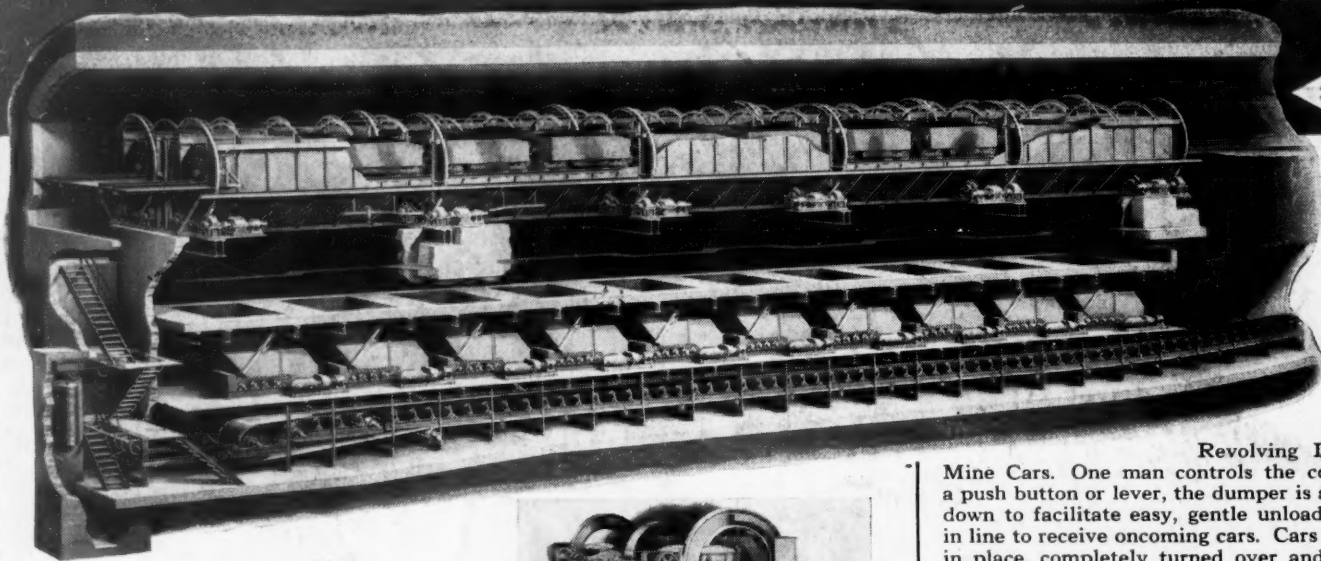
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Emlenton, Pa., Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.



**AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE**

In Business for Your Safety

Faster Car Moving ... Less Degradation ... Lower Maintenance With STANDARD LINK-BELT CAR DUMPER



1. Twin Link-Belt car dumpers, each handling 10 cars simultaneously.

2. Traction-Trolley Revolving Dumper for Swivel Mine Cars. One man controls the complete operation.

a push button or lever, the dumper is automatically started down to facilitate easy, gentle unloading and stopped in line to receive oncoming cars. Cars are automatically in place, completely turned over and discharged cleanly with no spillage. Thoroughly protected by safety devices.

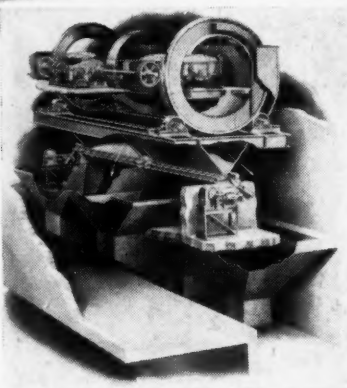
Is car dumping and moving a production bottleneck? In operations over the country, Link-Belt car dumpers and car movers are proving a profitable investment in speeding up movement of cars to increase productive capacity and lessen coal degradation. Many years of specialized effort and experience are back of these developments.

Link-Belt standardization on designs of dumpers for mine and railroad cars means money saved and better service. Link-Belt mine car dumpers are made in sizes to accommodate one or more cars at a time (up to 10 cars), capacities 2 to 15 tons per car. Link-Belt R. R. car dumpers can handle all types of open top cars with capacities from 40 to 110 tons, at rates up to 30 cars per hour.

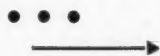
LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

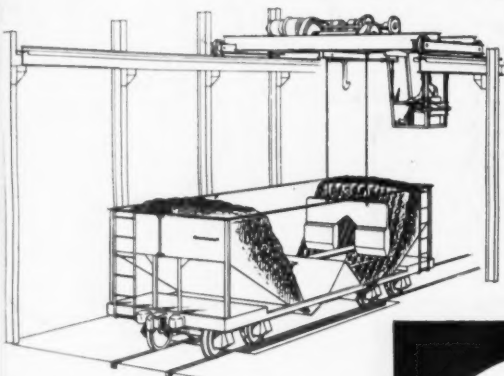
10,327



3. Gear Driven Revolving Mine Car Dumper in combination with motor-operated fly gates, provides for properly discharging any combination of two cars loaded with rock or coal, to the coal and rock hoppers respectively. The dumper revolves through an angle of 135° in either direction, automatically reverses and stops in upright position.



4. The Link-Belt rotary railroad car dumper has been developed to the point where it is within the economic reach of those whose unloading requirements are fairly low. It can unload any type of open-top railroad car from the smallest to the largest, completing the unloading cycle in 1½ minutes.



5. Link-Belt Coal Displacer assists in the movement of coal out of hopper-bottom cars. The 6,000 lb. blade is controlled by means of the hoisting and traveling mechanism shown.

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